No.01

Oki Data CONFIDENTIAL

ML5100FB PRINTER
Maintenance Manual

[Rev. 2]

Related drawings

Drawing No.	Name
43718205TL	ML5100FB PRINTER Disassembly for Maintenance
43718205TR	ML5100FB PRINTER RSPL

BOM		Use for		Certification Body	
Rev	Date	DCO No.	Contents	Design	Approval
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Check Hideyuki Konno		
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PREFACE

This manual is for people involved in maintenance and describes on-site maintenance methods for ML5100FB.
Among the configured parts, those that must be specified for ordering such as print circuit board are applied with a number.

E.g. ABCD-3 Print circuit board

The number is applied to specify the type of configuration part and is not the version number.
Parts are not described in numbers other than those listed in the configuration parts table unless otherwise required.
Regarding the methods for handling and operating the device, please refer to the Users Manual.

CAUTION:

- Copying this document or a portion of this document without permission is prohibited.
- The contents of this document is liable to change with no advance notice.

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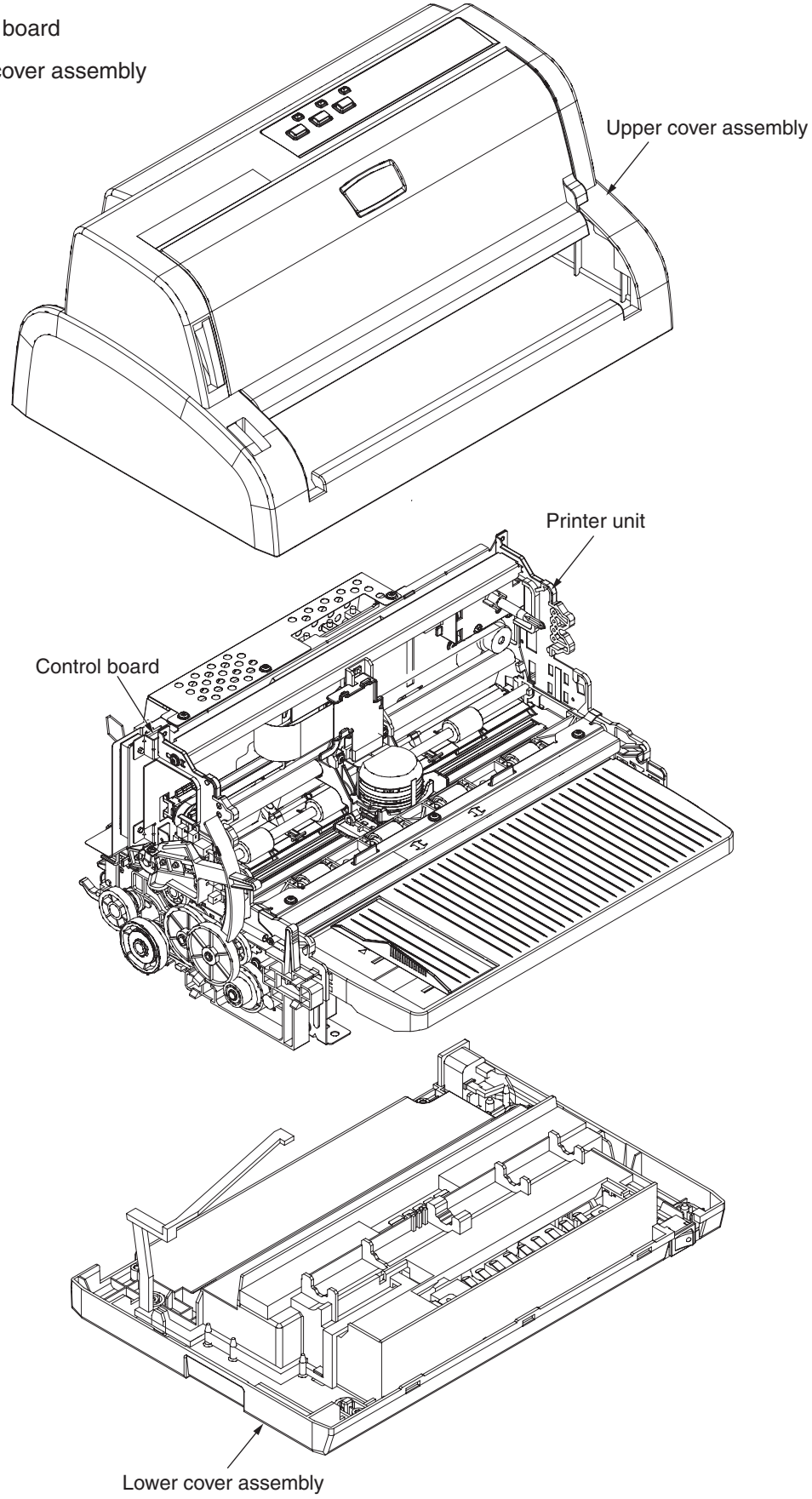
1. CONFIGRATION

1.1 Standard Configuration

(1) Upper cover assembly
(2) Printer unit
(3) Control board
(4) Lower cover assembly



2. CLEANING

CAUTION:

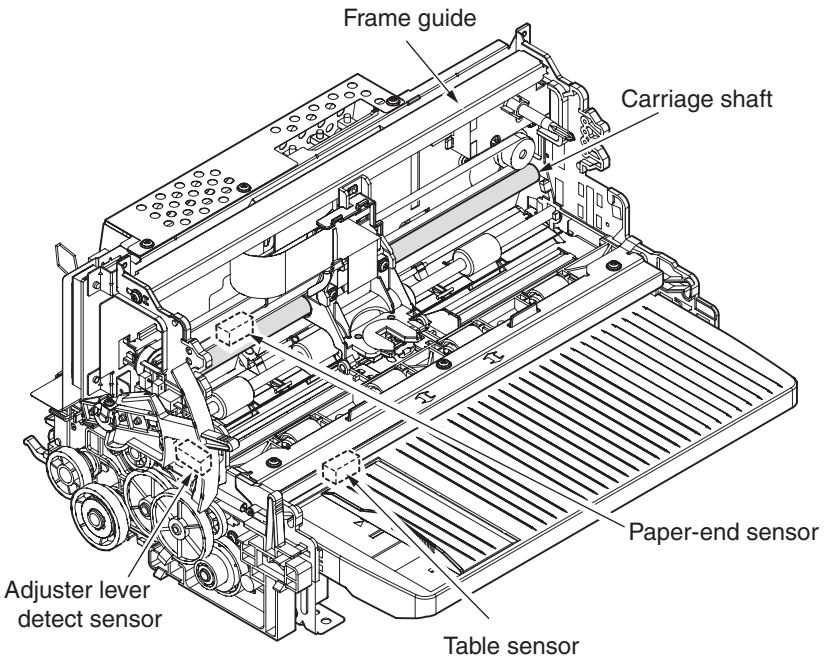
- Turn OFF the power source switch when cleaning.
- Be careful that chipped paper or dust does not go into the mechanism.
- After cleaning lubricated portions, be sure to lubricate again.

Clean the inner sections of the printer at a scheduled interval according to the following conditions.

Interval: After operating for six months or 300 hours.
Required Time: Approx. 10 minutes
Tools: Dry cloth (soft cloth such as a gauze), brush, cotton swabs, vacuum cleaner
Sections to Clean: See Table 2-1.

Table 2-1 Section to Clean

Section to Clean	Contents
Carriage shaft and its periphery	Eliminate chipped paper and wipe away dust, ribbon chips, etc.
Both sides of the frame guide upper section	
Paper path surface	
Paper-end sensor Table sensor Adjuster lever detect sensor Carriage homing sensor	Wipe off dust attached to the sensor using a brush or cotton swag.



2.1 Cleaning the Sensors

2.1.1 Cleaning the table sensor and paper-end sensor

(1) Remove the upper cover assembly. (See 5.2.3)

(2) Remove the control board. (See 5.2.4)

(3) Wipe the sensor with a cotton swab.

2.1.2 Cleaning the gap sensor and carriage sensor

(1) Remove the upper cover assembly. (See 5.2.3)

(2) Wipe the sensor with a cotton swab.

3. LUBRICATING

Lubricate the required section according to the following items.

(1) Timing
This printer is a maintenance-free device, therefore, it does not require lubrication while in operation. However, it must be lubricated after disassembling/reassembling, cleaning lubricated sections, or replacing parts.

(2) Lubricant
- Pan Motor Oil 10W-30 (Nippon Mobile or an equivalent product)..... PM
- Albania Grease #2EP (Showa Shell Oil or an equivalent product) ..... GEP

(3) Amount of lubricant
- Sufficient .....Ⓐ ..... Apply the amount of lubricant needed.
- Normal .....Ⓑ ..... Apply three or four drops of oil or approximately 0.2 mm thick grease.
- Small .....Ⓒ ..... 0.006 ± 0.002 g

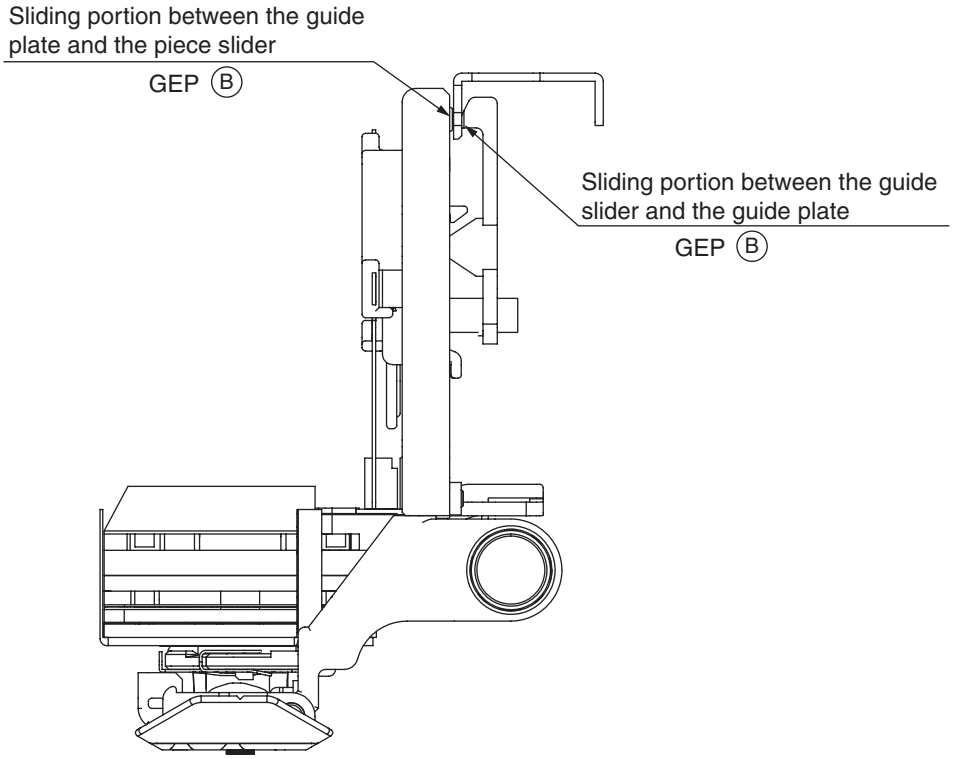
(4) Parts that must not be lubricated

Table 3-1 Parts that must not be lubricated

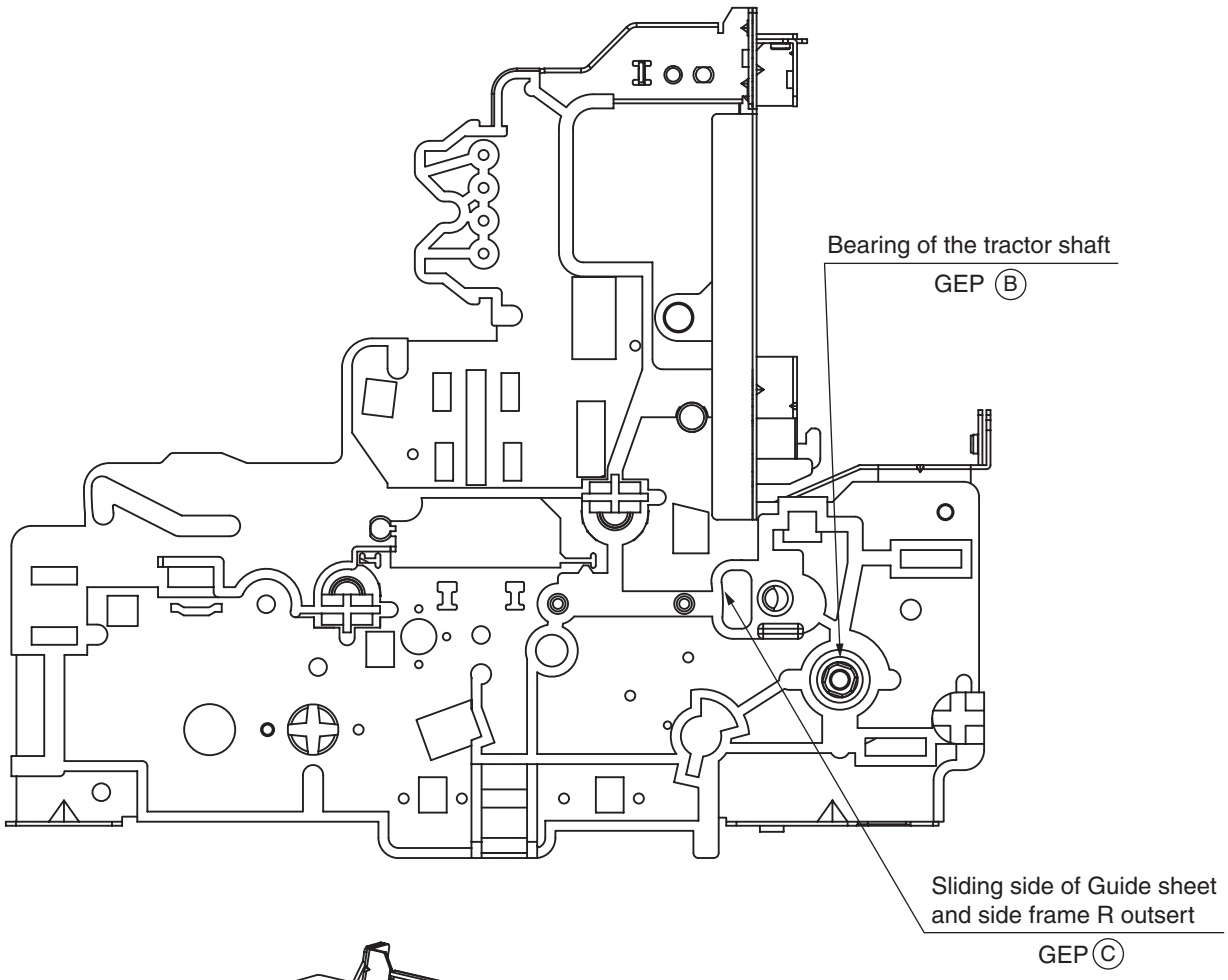
No.	Prohibited Parts	Reason	Remarks
1	Ink ribbon	To prevent smeared print	
2	Sensors	To prevent dust from attaching	
3	Platen (resin surface)	To prevent smeared paper	
4	Feed roller (resin surface)	To prevent smeared paper	
5	Pin tractor	To prevent rubber from deteriorating	
6	Carriage shaft	To secure carriage run load	
7	Head cable	To prevent faulty contact and cracking	
8	Print head	To prevent faulty operation of print head	
9	Mini pitch belt B	To avoid rubber deterioration	
10	Carriage board	To avoid contact failure	
11	Terminal (e.g., connector)	To avoid contact failure	
12	Microswitch	To avoid contact failure	

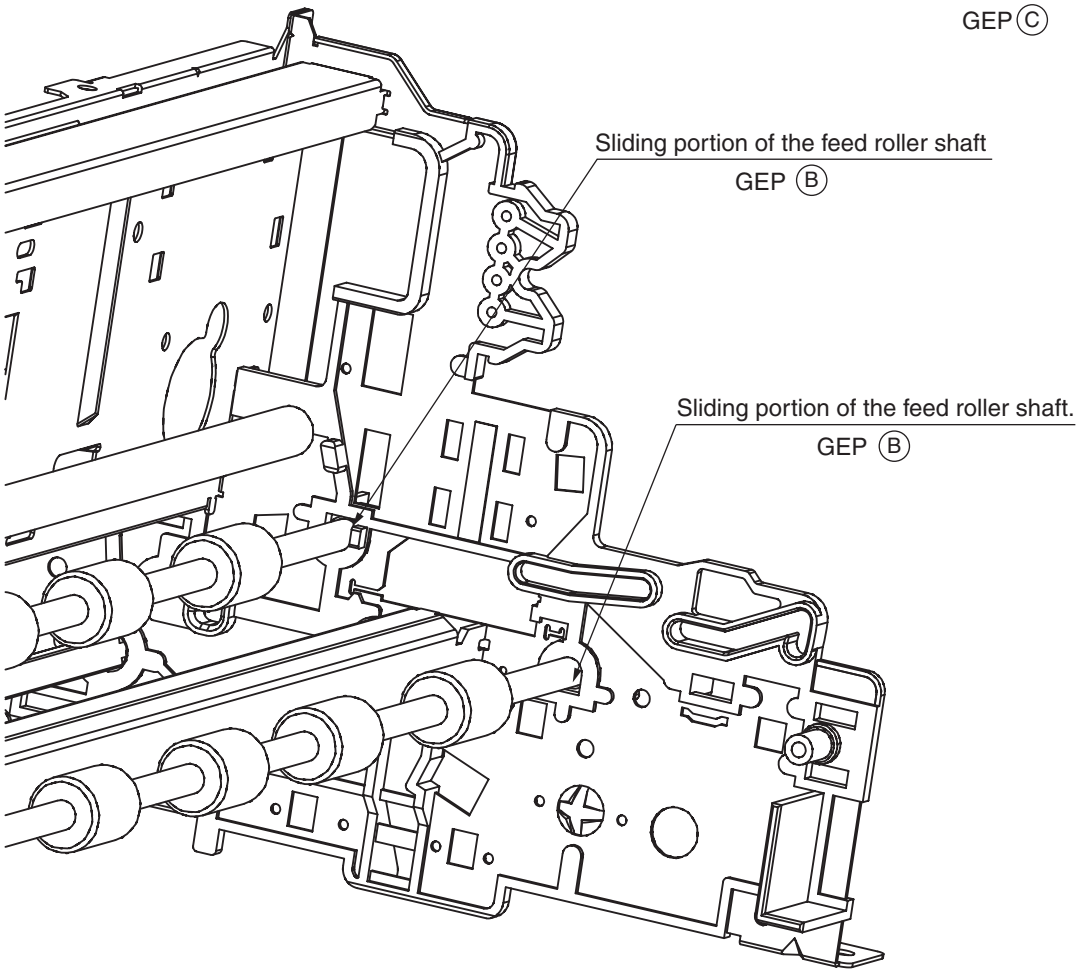
(5) Parts to lubricate
Lubricate the parts indicated in the following figure.

a) Slide guide section of the carriage

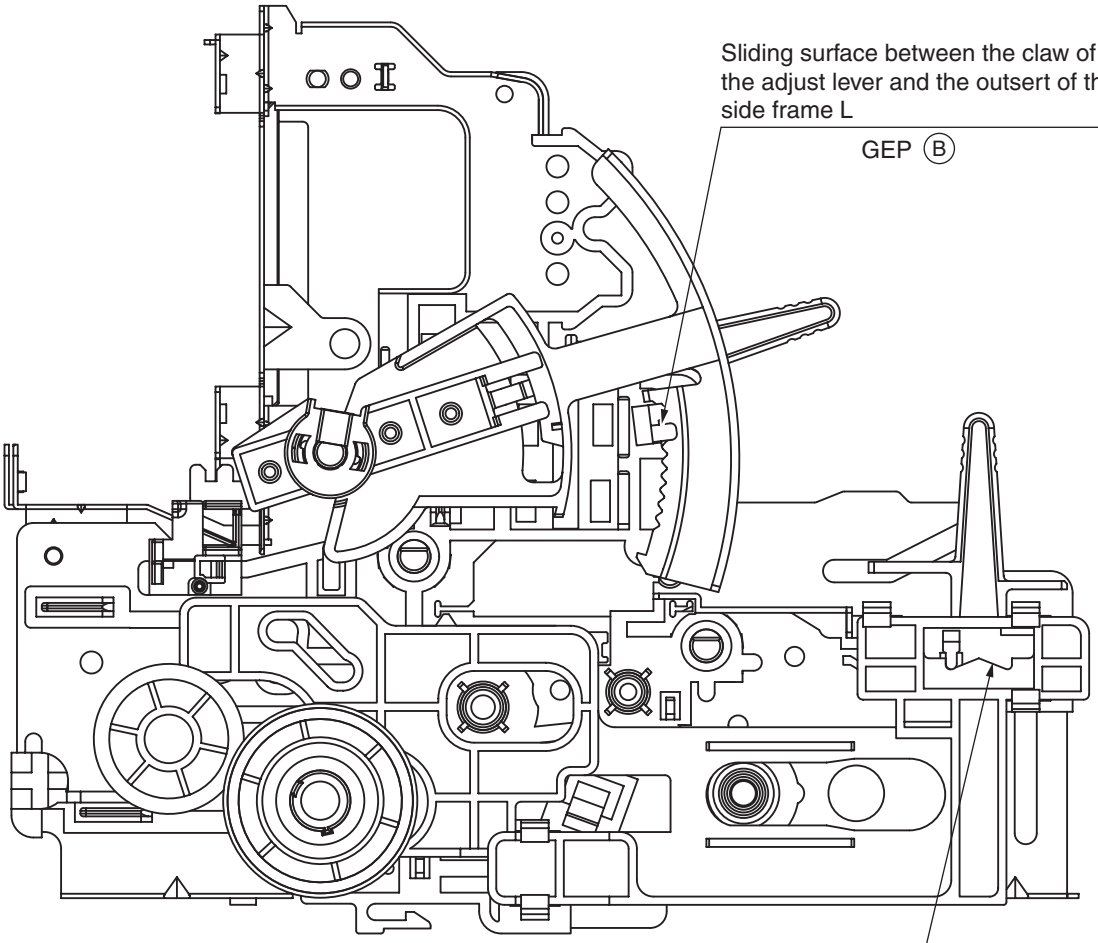

Sliding portion between the guide plate and the piece slider
GEP (B)
Sliding portion between the guide slider and the guide plate
GEP (B)

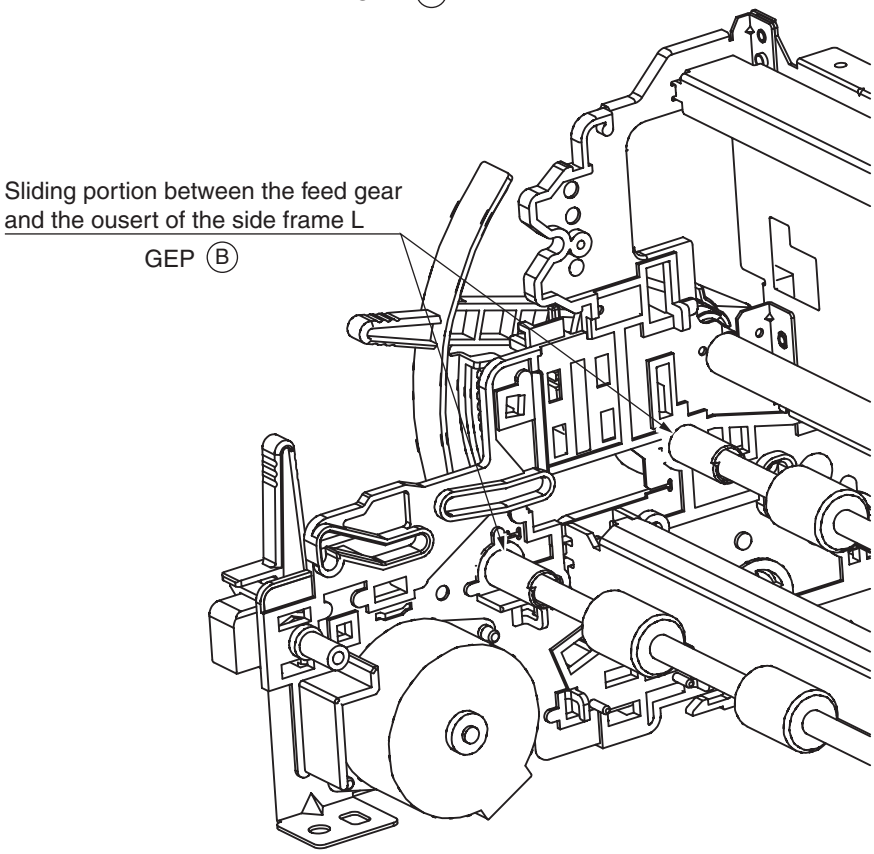
b) Printer section - right side

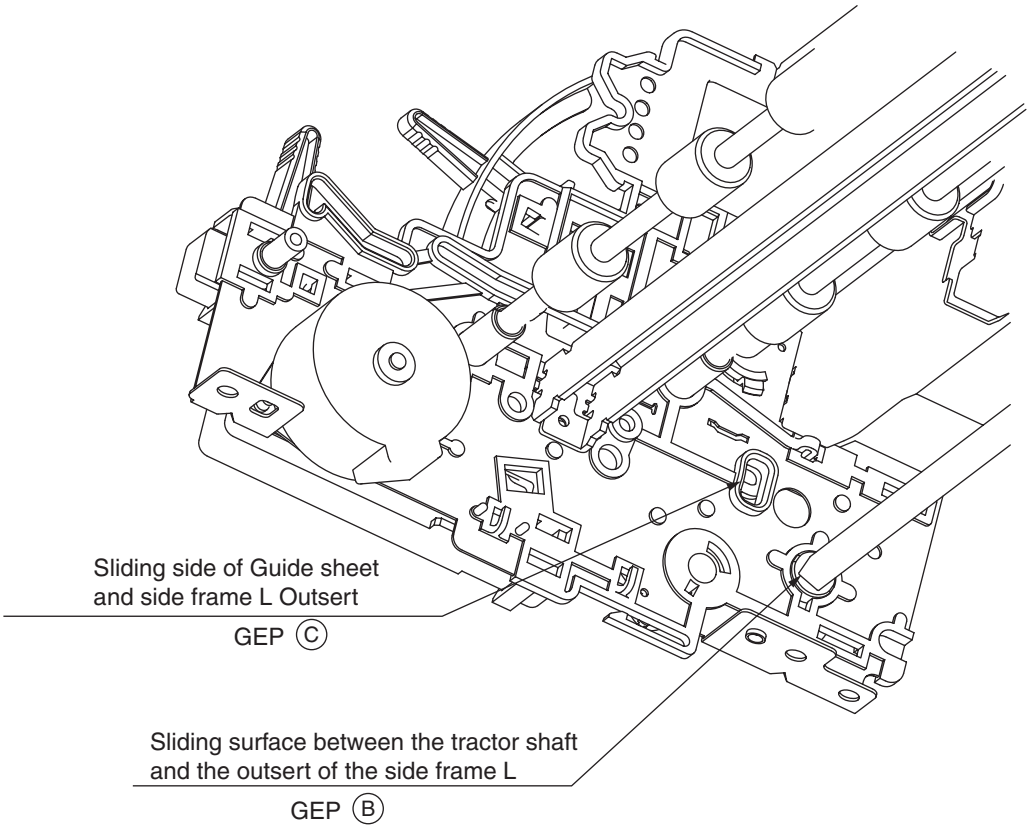




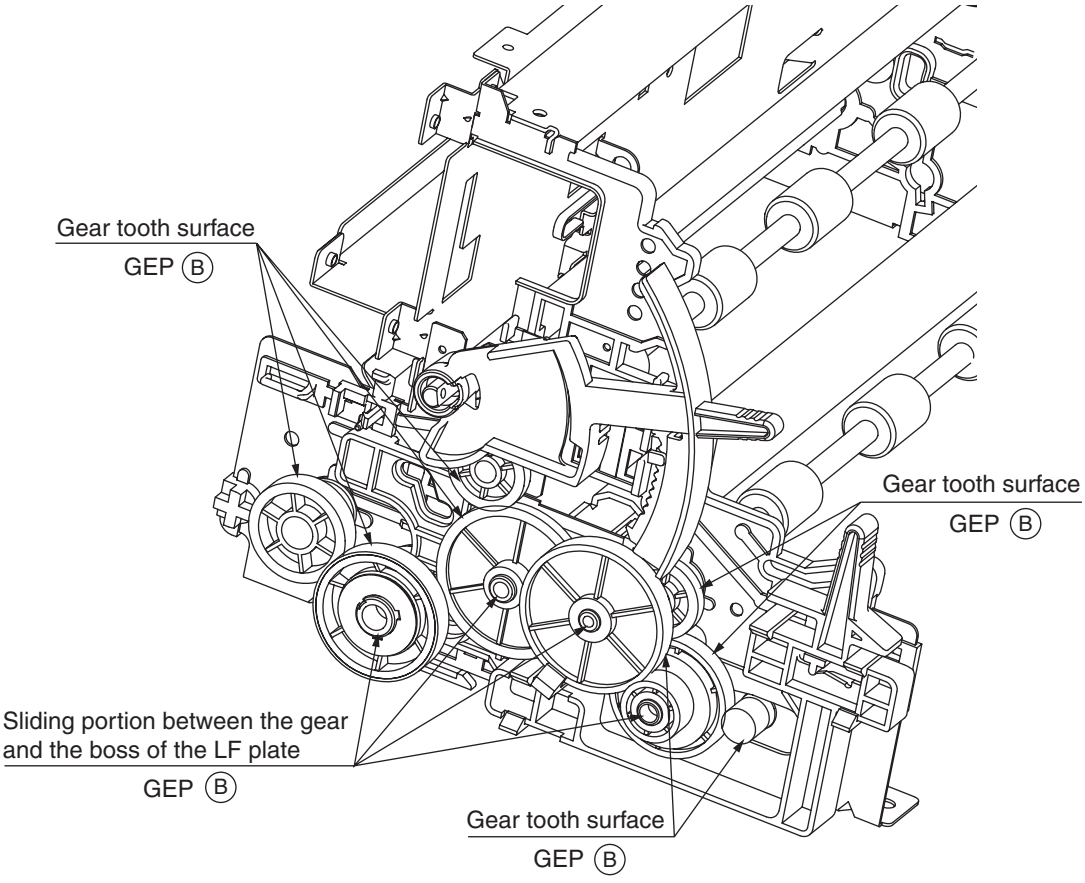
c) Printer section - left side


Sliding surface between the claw of the adjust lever and the outsert of the side frame L
GEP (B)
Sliding surface between the change lever and the side frame
GEP (B)

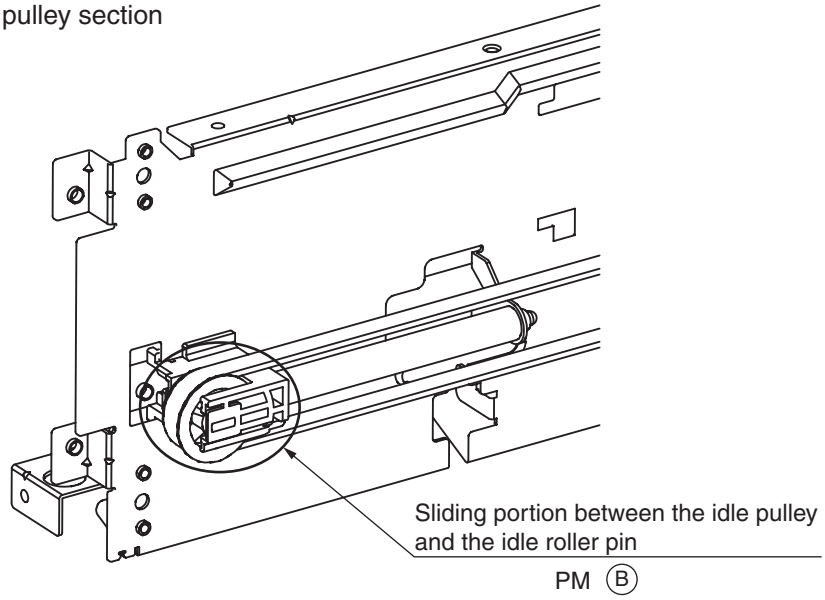



Sliding side of Guide sheet
and side frame L Outsert
GEP Ⓒ
Sliding surface between the tractor shaft
and the outsert of the side frame L
GEP Ⓑ

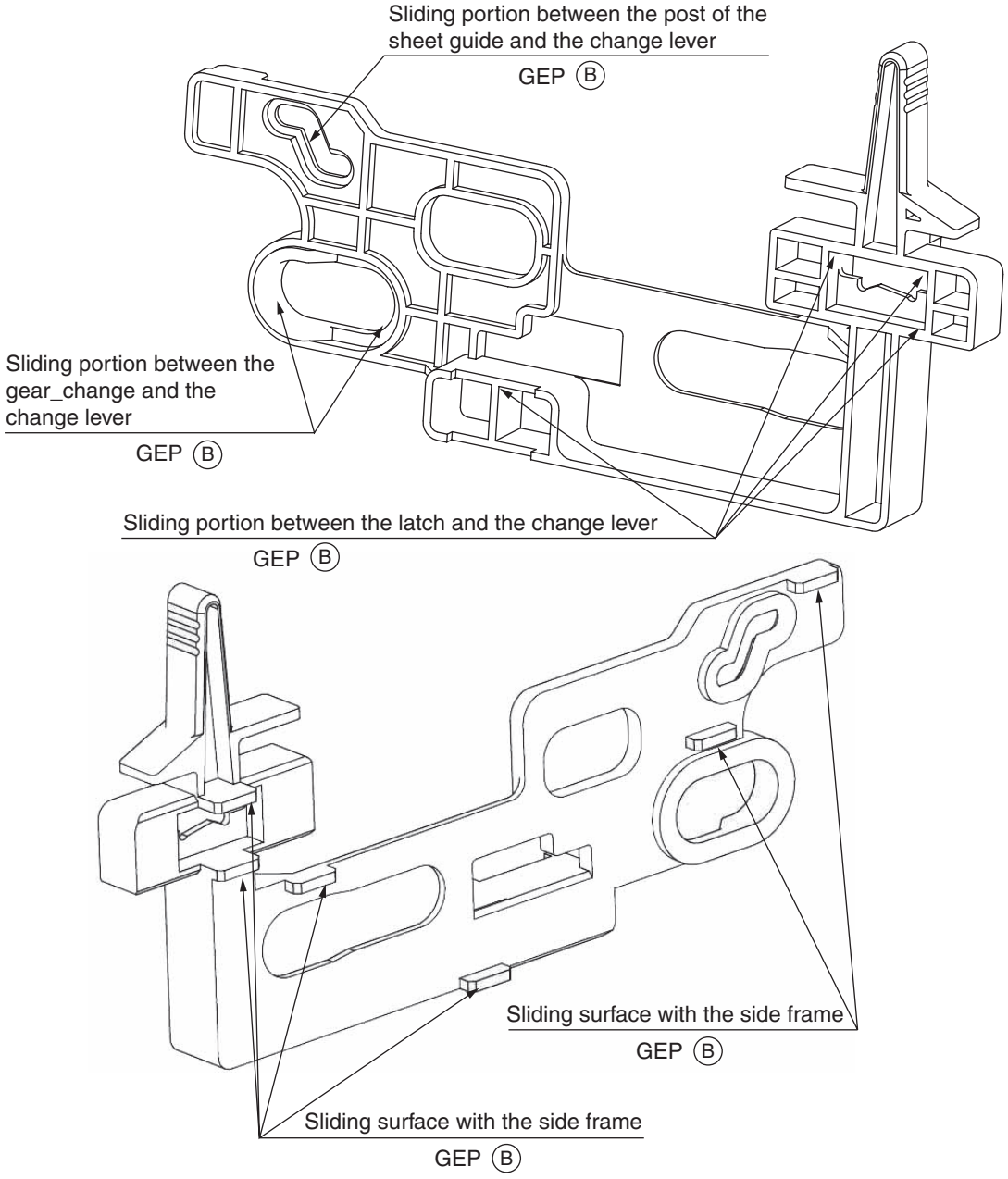
d) LF gear


Gear tooth surface
GEP Ⓑ
Gear tooth surface
GEP Ⓑ
Sliding portion between the gear
and the boss of the LF plate
GEP Ⓑ
Gear tooth surface
GEP Ⓑ

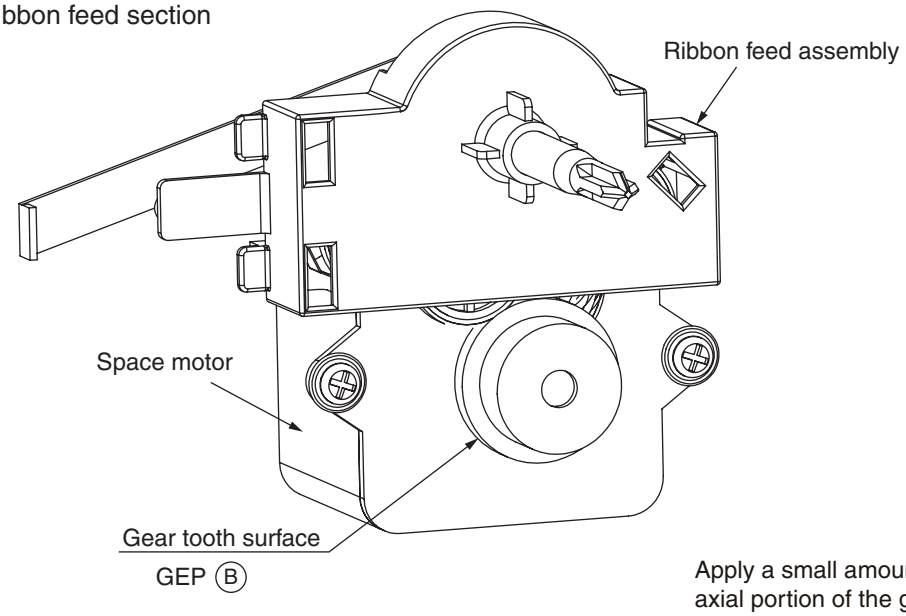
e) Idle pulley section

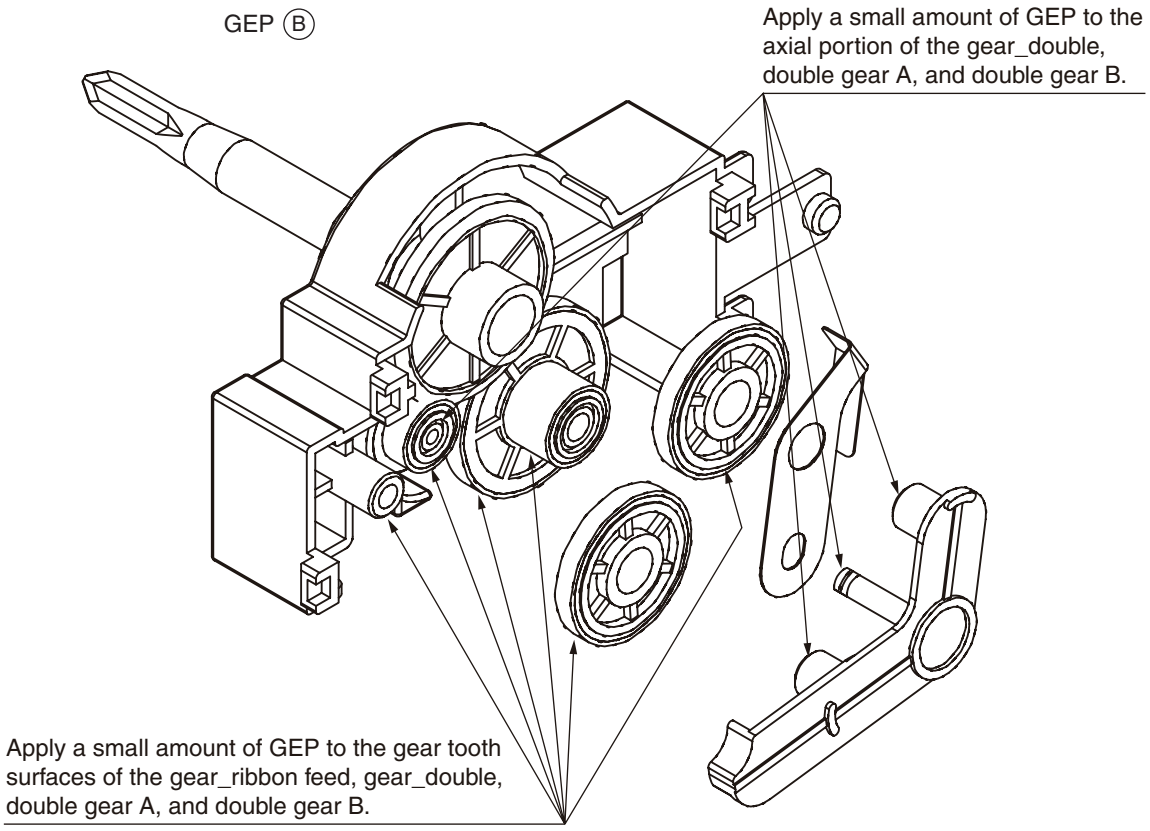


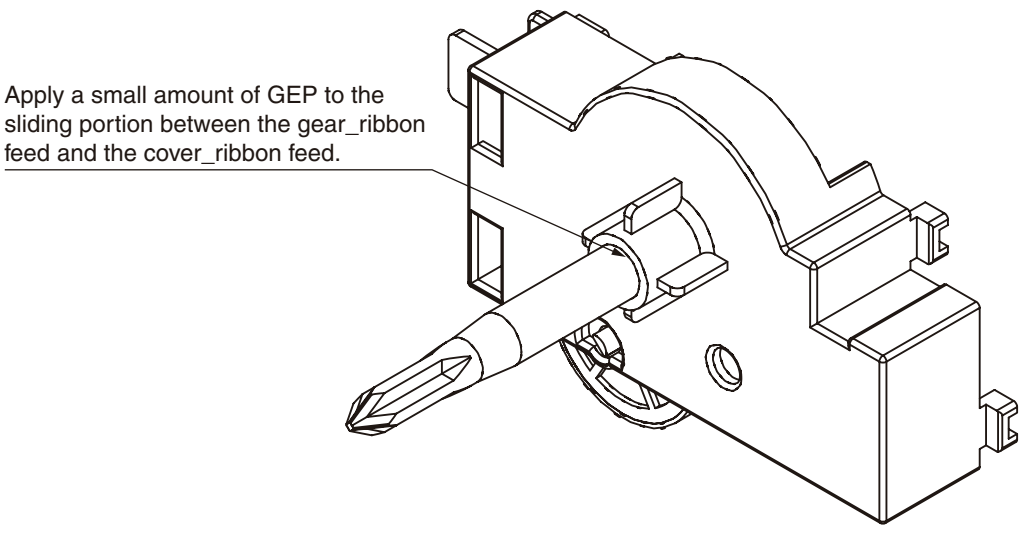
f) Change lever section


Sliding portion between the post of the sheet guide and the change lever
GEP (B)
Sliding portion between the gear_change and the change lever
GEP (B)
Sliding portion between the latch and the change lever
GEP (B)
Sliding surface with the side frame
GEP (B)
Sliding surface with the side frame
GEP (B)

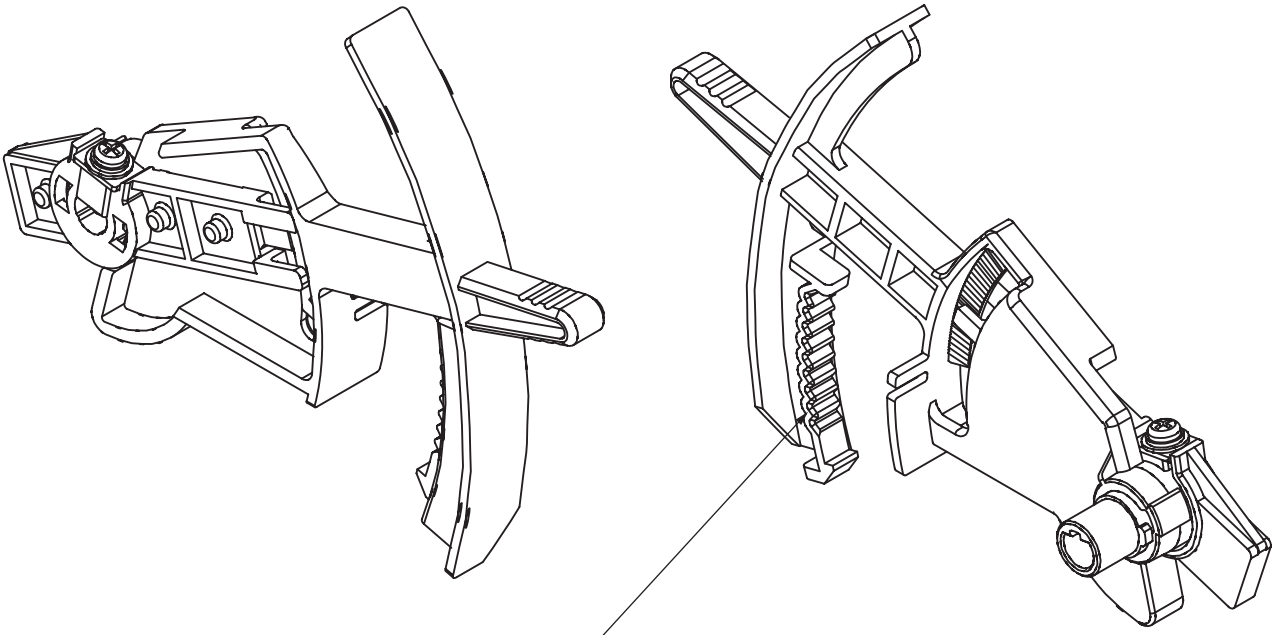
g) Ribbon feed section




Apply a small amount of GEP to the axial portion of the gear_double, double gear A, and double gear B.
Apply a small amount of GEP to the gear tooth surfaces of the gear_ribbon feed, gear_double, double gear A, and double gear B.



h) Adjust lever section



Sliding side nail of Side Frame L Outsert

GEP (B)

4. MAINTENANCE TOOLS

Tools required for replacing parts of the print board and unit on-site are listed in Table 4-1.

Table 4-1 Maintenance Tools

No.	Maintenance Tools	Quantity	Application	Remarks
1	No.1-100 Phillips screwdriver	1	2~2.6 mm screws	
2	No.2-200 Phillips screwdriver	1	3~5 mm screws	
3	5-200 screwdriver	1	3~5 mm screws	
4	Thickness gauge	1	0.43~0.49 thickness	J-42639901YA-3
5	No.3 pliers	1		
6	No.5 nippers	1		

5. REPLACING PARTS

5.1 Precautions Upon Replacing Parts

(1) Turn OFF the printer power switch before disassembling, and first pull the AC plug out from the outlet, then disconnect the AC cord and interface cable from the printer.

⚠Warning	Risk of Electric Shock	

There is a risk of electric shock during replacement of the low voltage power supply.

Use insulating gloves or avoid direct contact with any conducting part of the power supply, and caution should be exercised during replacement.

The capacitor may take one minute to complete discharge after the AC cord is unplugged. Also, there is a possibility that the capacitor doesn't discharge because of a breakage of the PCB, etc., so remember the possibility of electric shock to avoid electric shock.

(2) The print head is extremely hot after a print job, therefore, start the disassembling task five minutes after turning OFF the power.

Furthermore, leave at least 20 seconds after turning OFF the power before disassembling the circuit parts (control board, print head, etc.) in order to prevent electronic parts from being damaged.

(3) Remove paper and ribbon from the printer before disassembling.

(4) After replacing or inspecting parts, be sure to check that connecters are properly connected and that there are no abnormalities.

(5) Do not disassemble the printer when it is operating properly.

(6) Determine the range of disassembling the printer according to the objective and do not disassemble beyond that range.

(7) Use specified maintenance tools.

(8) Disassemble the parts in the specified order. Parts may damage if they are not disassembled in proper order.

(9) Small items such as screws and collars can be lost easily, therefore, set them in their original position temporarily.

(10) IC such as microprocessors, ROM, and RAM can easily be damaged by electrostatic, therefore, do not wear gloves that build up electrostatic when handling the print board.

(11) Do not place the print board directly on the floor or printer.

5.2 Removing and Reinstalling Parts

5.2.1 Print head

(1) Open the access cover.

(2) Move the adjust lever to the top.

(3) Pull the upper sheet guide toward the front to lock it.

(4) Disconnect the guide cable ①.

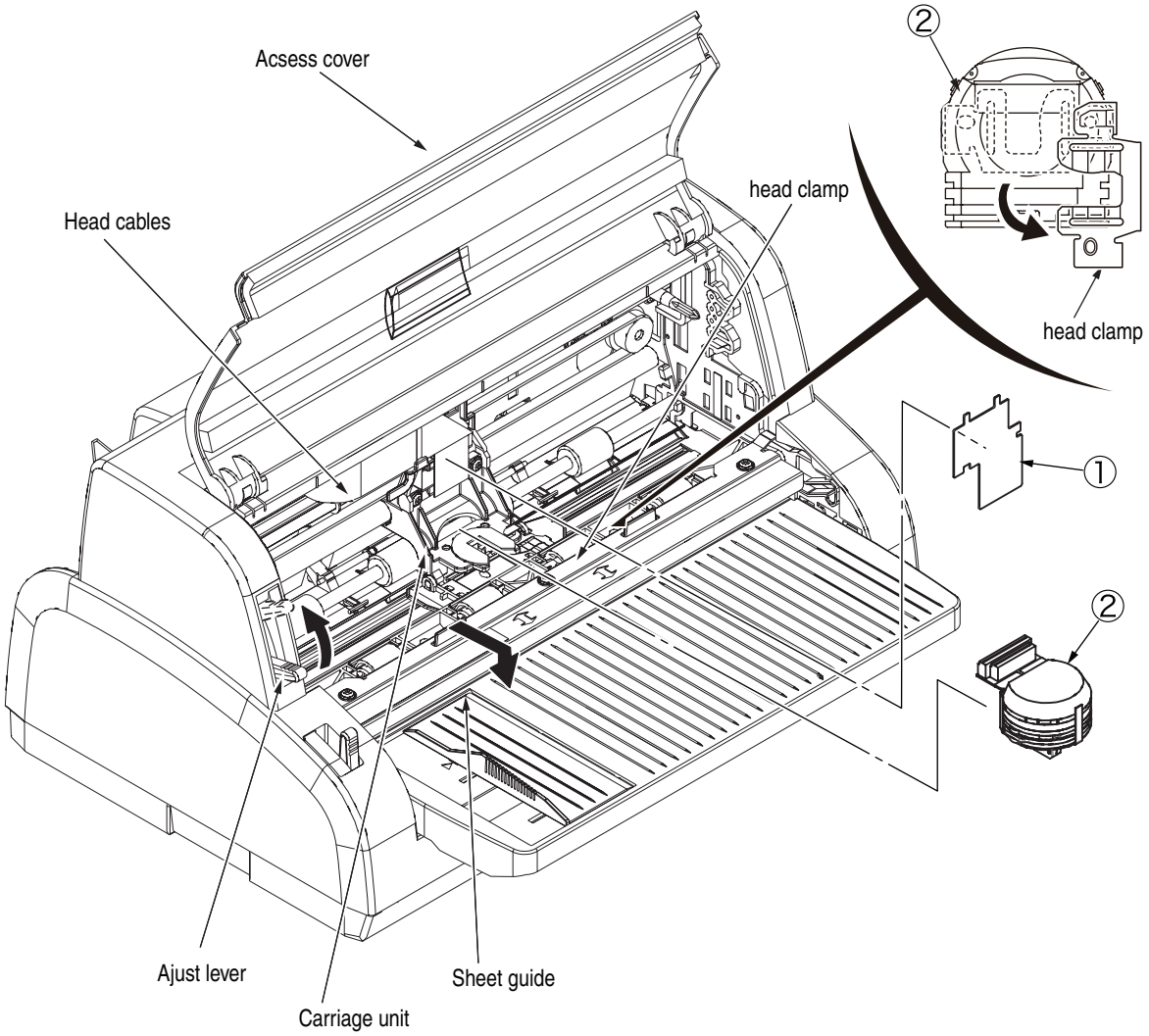
(5) Pull the head clamp toward the front and remove the print head ② by pulling it out toward the front.

(6) Disconnect the two head cables from the print head ②.

(7) Reinstall in the opposite sequence to removal.

(Precautions upon reinstalling)

1. The head clamp must be set securely in the print head ② and carriage unit.



5.2.2 Ribbon protector bracket and Ribbon protector

(1) Remove the print head. (See 5.2.1)

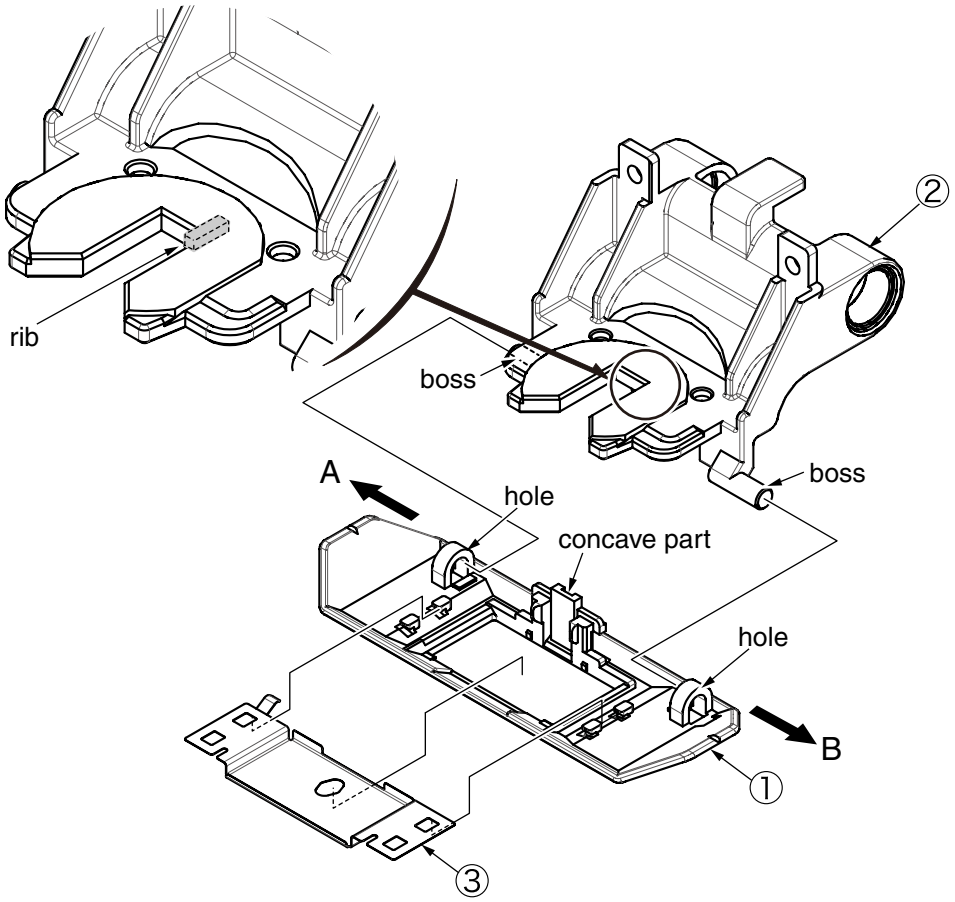
(2) Bend the ribbon protector bracket ① and detach the concave part from the rib of the carriage frame ②.

(3) Slide the ribbon protector bracket ① in the direction of the arrow A and pull the hole of the ribbon protector bracket ① out of the boss .

(4) Slide the ribbon protector bracket ① in the direction of the arrow B and pull the hole of the ribbon protector bracket ① out of the boss .

(5) Remove the ribbon protector ③ from the ribbon protector bracket ①.

(6) Reinstall in the opposite sequence to removal.



5.2.3 Upper cover assembly

(1) Remove the stage assembly ①.

(2) Move the adjust lever ② to the top.

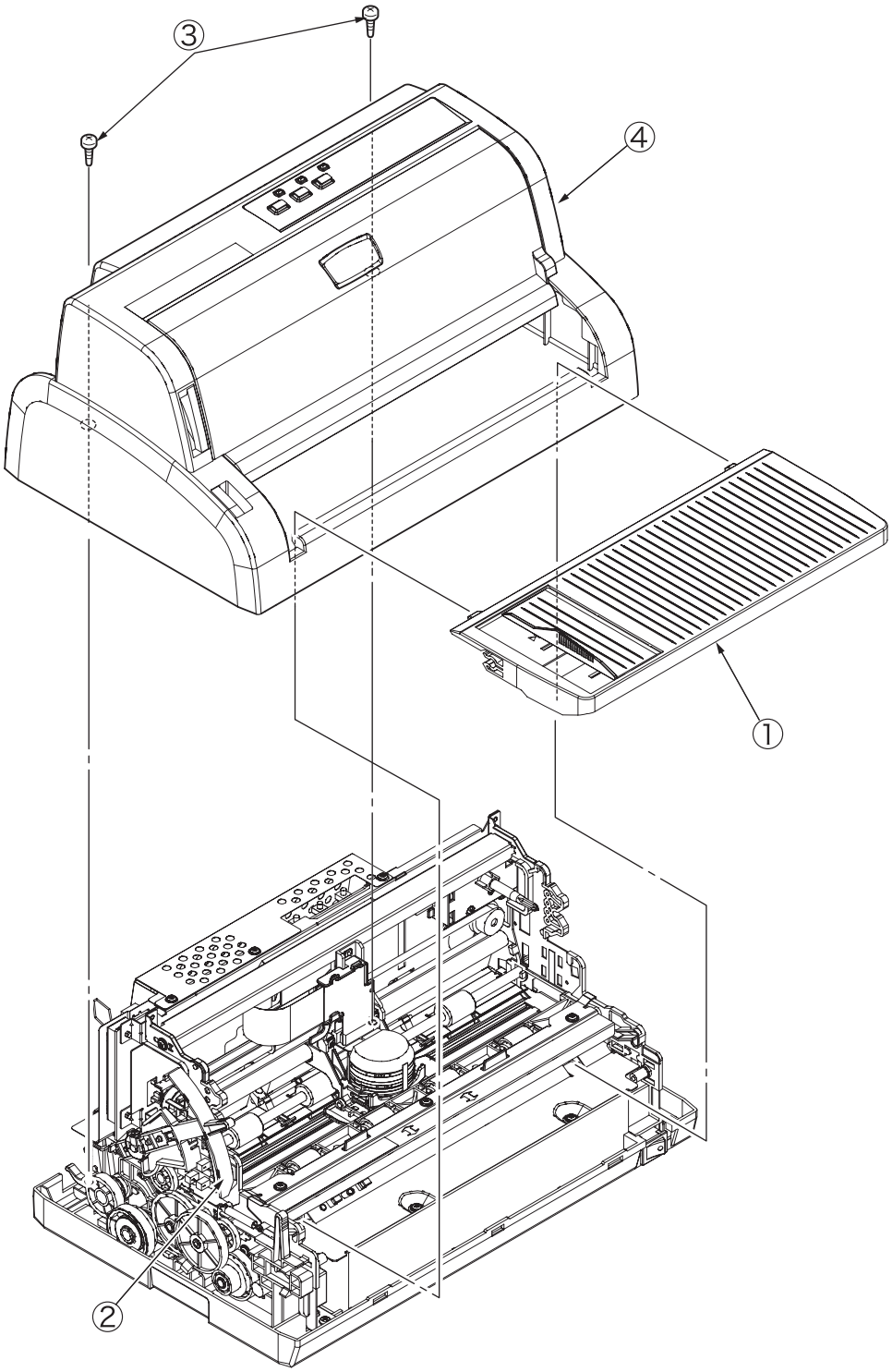
(3) Remove the two screws ③ in the rear.

(4) Detach the three hitch portions from the lower cover in the front section of the upper cover assembly ④.

* The hitched portions can easily be detached by inserting a minus driver from the lower part of the upper cover.

(5) Remove the upper cover assembly ④ by lifting it straight up.

(6) Reinstall in the opposite sequence to removal.



5.2.4 Control board

(1) Remove the upper cover assembly. (See 5.2.3)

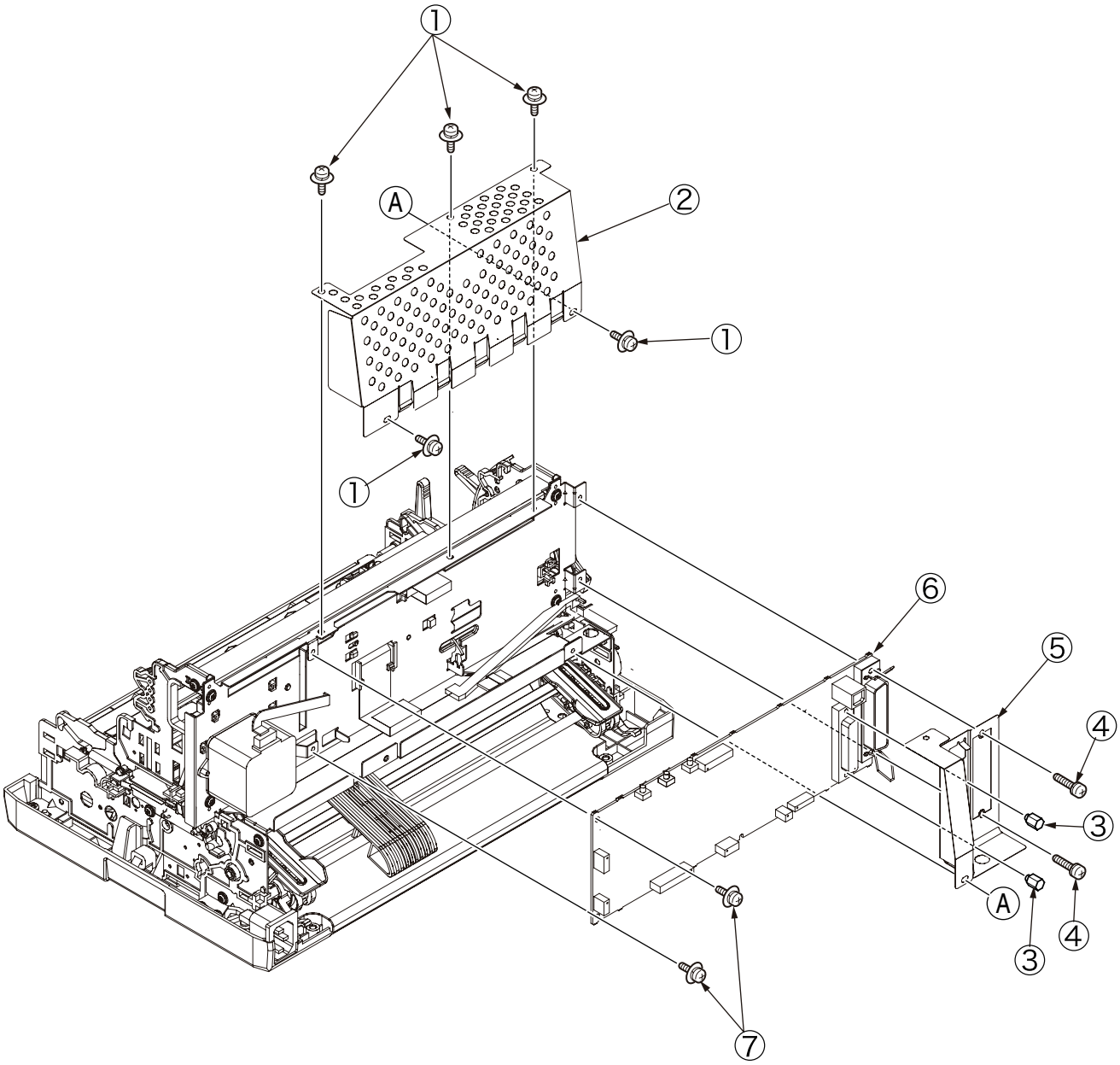
(2) Remove the five screws ①, then remove the plate shield (Main PG) ②.

(3) Remove the two hex-head screws ③ and two screws ④, then remove the IF/OP Bracket ⑤.

(4) Disconnect the SP motor, LF motor, Power supply, Printhead 1, Printhead 2, Paper sensor, Home sensor, and continuous/single sensor connectors from the control board ⑥.

(5) Remove the two screws ⑦, then remove the control board ⑥.

(6) Reinstall in the opposite sequence to removal.



5.2.5 Head cables

(1) Remove the printhead. (See 5.2.1)

(2) Remove the upper cover assembly. (See 5.2.3)

(3) Remove the control board. (See 5.2.4)

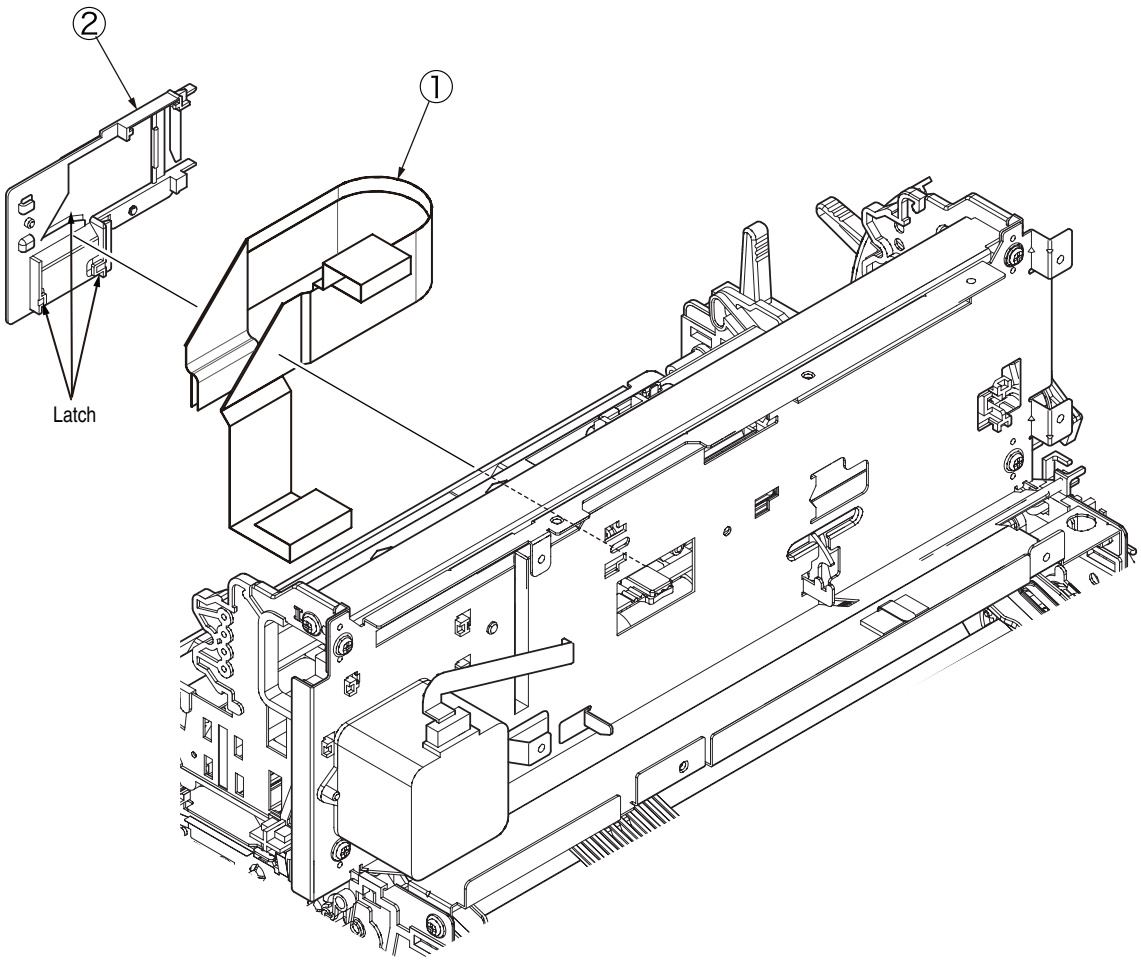
(4) Open the latch and remove the head cables ① together with guide cable ② from the space frame.

(5) Separate the head cables ① from the guide cable ②.

(6) Reinstall in the opposite sequence to removal.

(Precautions upon reinstalling)

1. Be careful to avoid kinking the head cables ①.
2. Do not touch the exposed terminals on the head cables ①. To prevent faulty connections, keep the terminals free of dirt and dust.

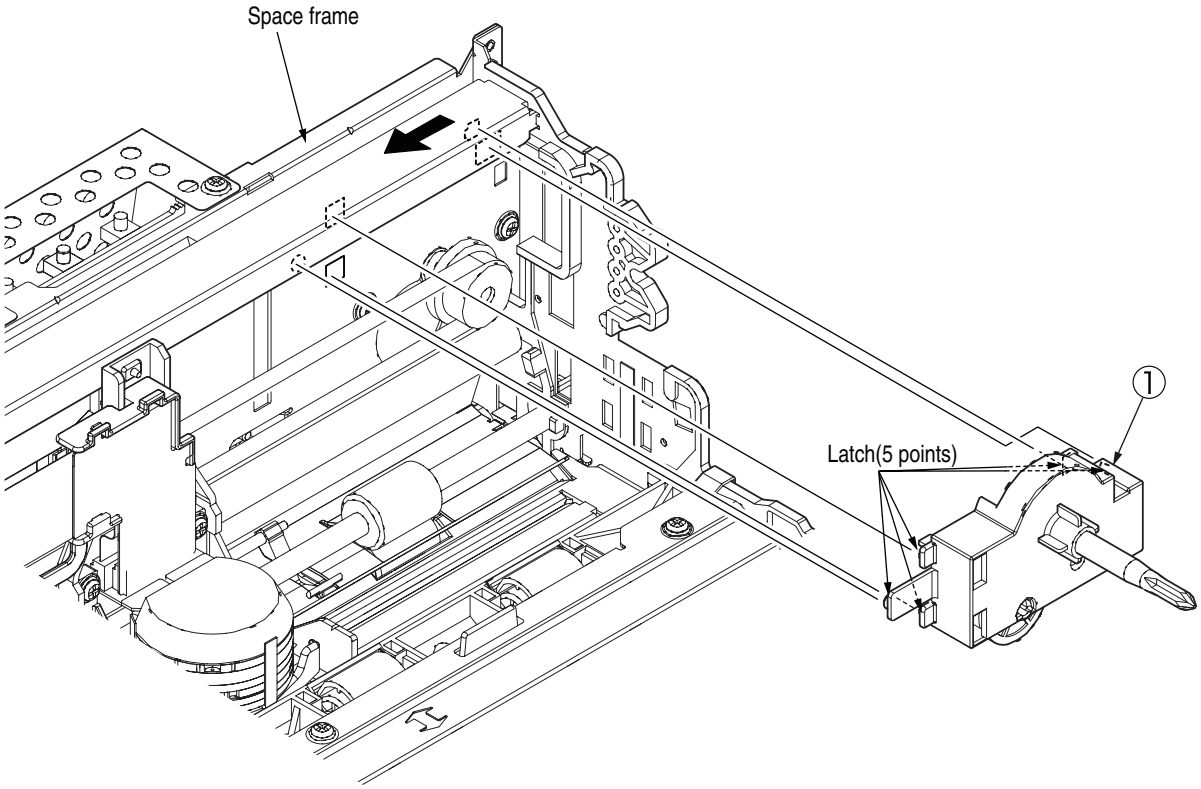


5.2.6 Ribbon feed assembly

(1) Remove the upper cover assembly. (See 5.2.3)

(2) Bend the latch on the space frame forward and slide in the direction indicated by the arrow. This allows the ribbon feed assembly ① to be removed in the forward direction.

(3) Reinstall in the opposite sequence to removal.



5.2.7 Space motor

(1) Remove the upper cover assembly. (See 5.2.3)

(2) Remove the ribbon feed assembly. (See 5.2.6)

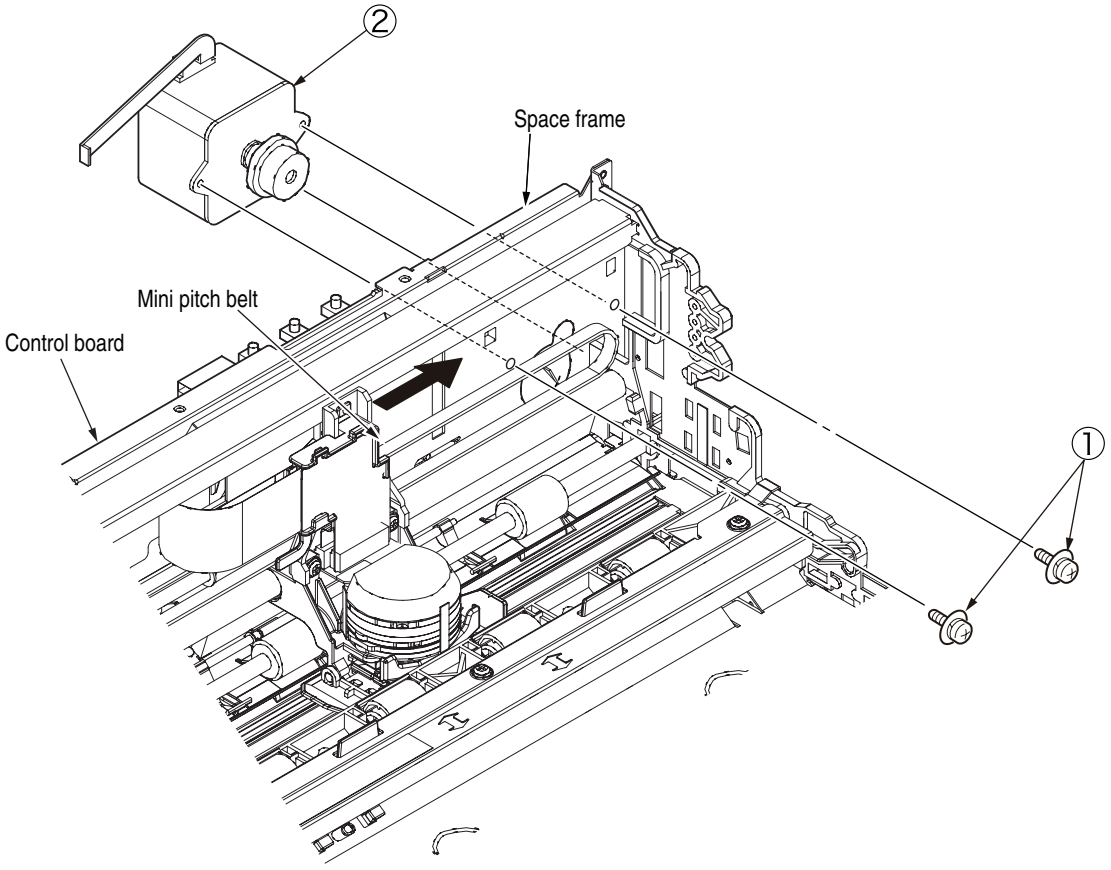
(3) Remove the shield plate B. (See 5.2.4)

(4) Disconnect the space motor connector cable from the control board.

(5) Push the mini pitch belt in the direction indicated by the arrow and remove the pulley belt from the motor pulley.

(6) Remove the two screws ①, then remove the space motor ② from the space frame.

(7) Reinstall in the opposite sequence to removal.



5.2.8 Frame guide

(1) Remove the upper cover assembly. (See 5.2.3)

(2) Remove the control board. (See 5.2.4)

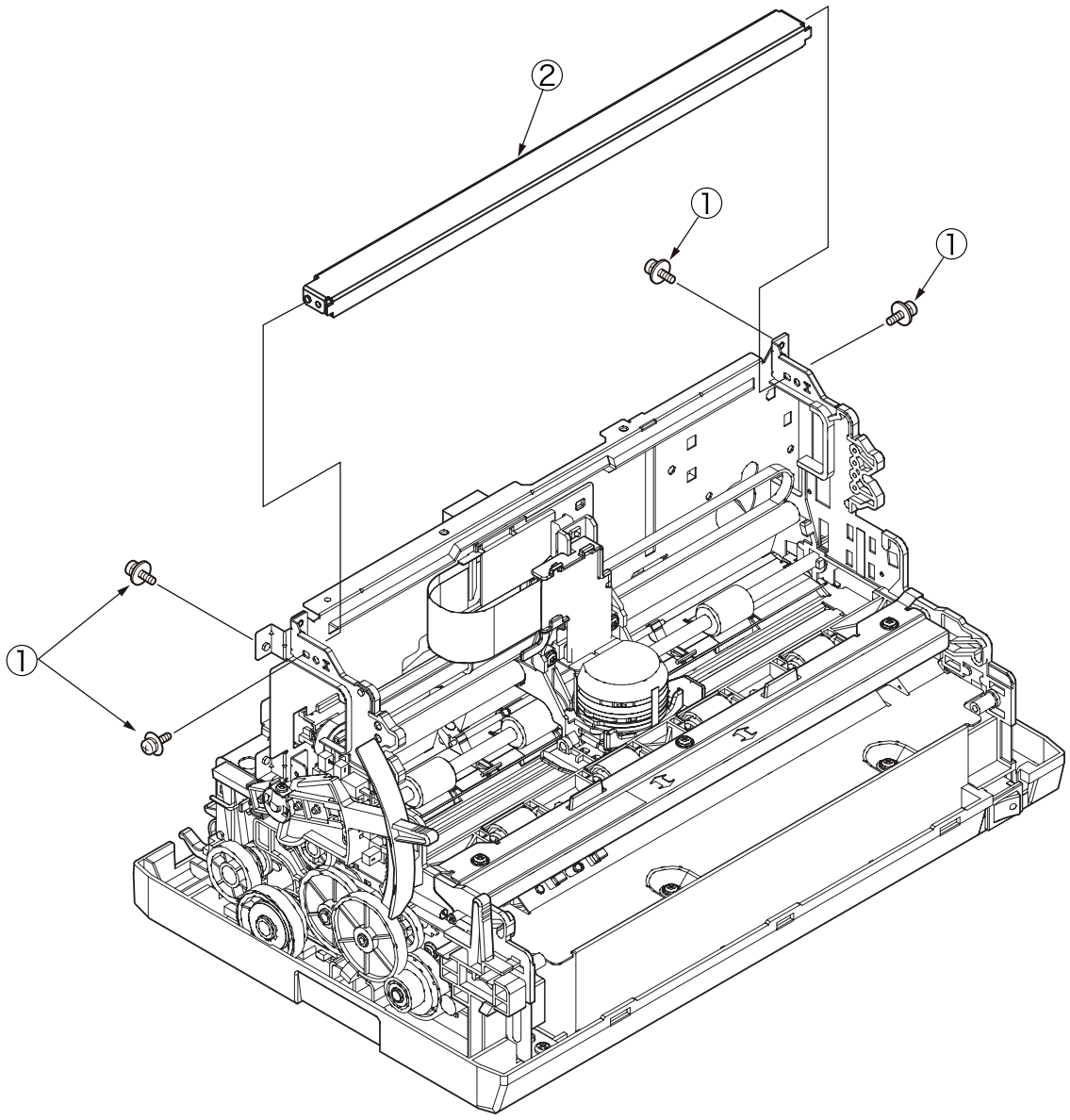
(3) Remove the two screws ①.

(4) Remove the frame guide ②.

(5) Reinstall in the opposite sequence to removal.

(Precautions upon reinstalling)

1. Check and adjust the print head and platen after reinstalling the parts. (See 6.1)
2. To assemble the frame guide ②, push it in the direction of arrows against the space frame.



5.2.9 Slider Pice-Slider

(1) Remove the upper cover assembly. (See 5.2.3).

(2) Remove the control board. (See 5.2.4)

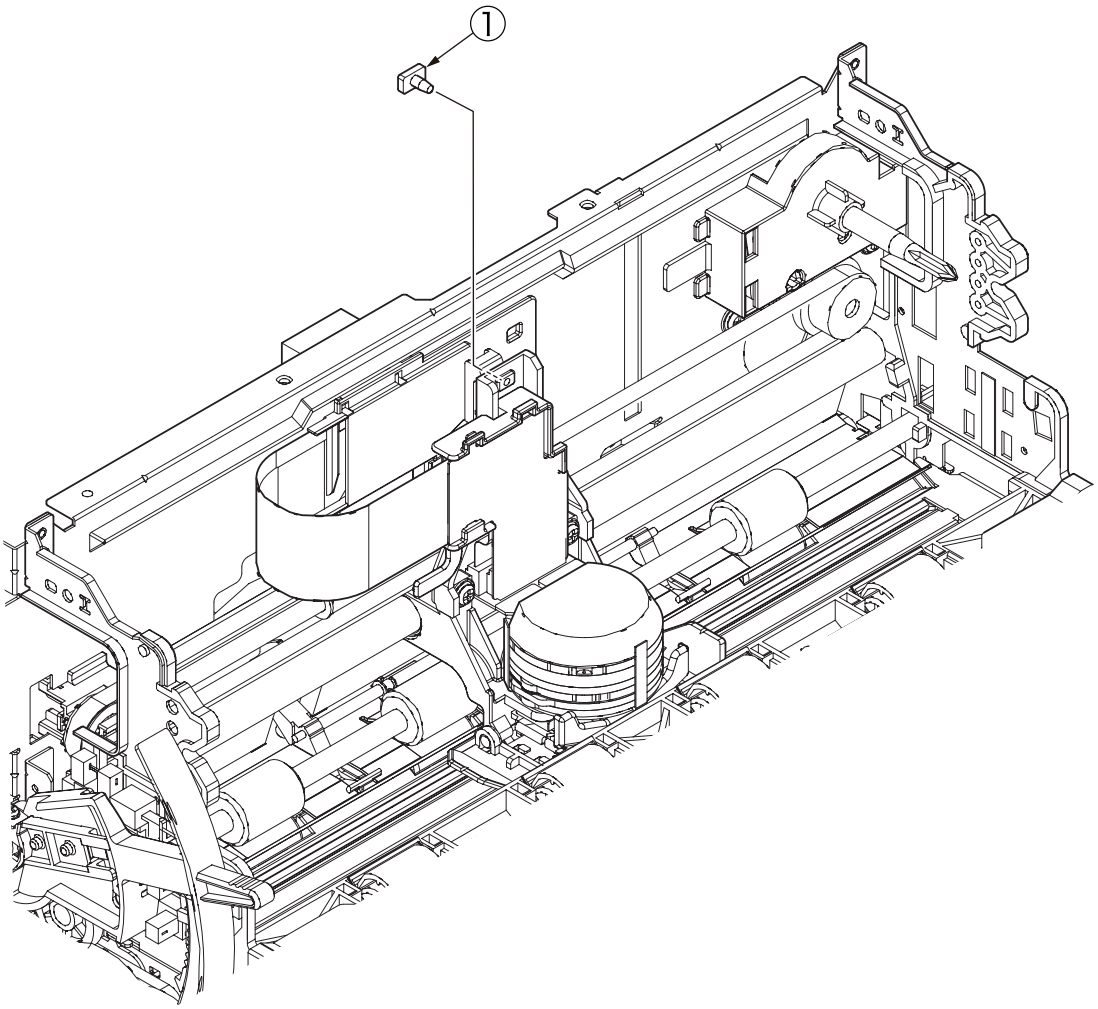
(3) Remove the frame guide. (See 5.2.8).

(4) Remove the slider piece ① from the carriage plate.

(5) Reinstall in the opposite sequence to removal.

(Precautions upon reinstalling)

1. Check and adjust the print head and platen after reinstalling the parts. (See 6.1)



5.2.10 Mini pitch belt

(1) Remove the print head. (See 5.2.1)

(2) Remove the upper cover assembly. (See 5.2.3)

(3) Push the idle pulley bracket in the direction indicated by the arrow and remove the mini pitch belt ① from the idle pulley.

(4) Remove the mini pitch belt ① from the pulley of the SP motor.

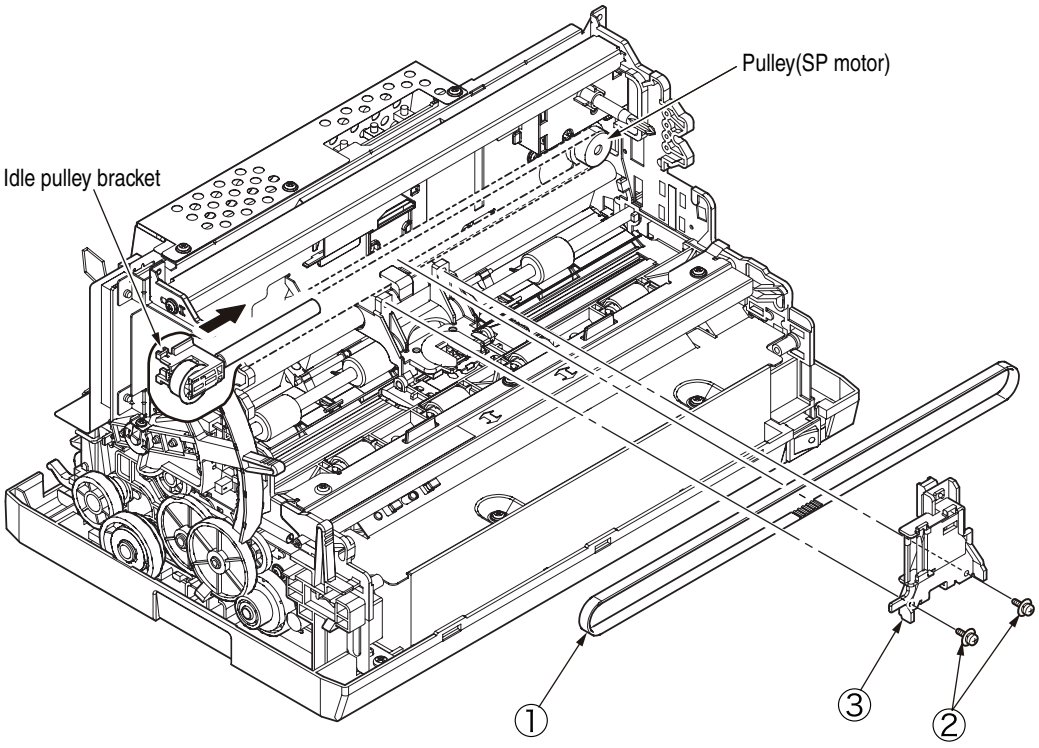
(5) Remove the two screws ②, then remove the carriage plate ③.

(6) Remove the mini pitch belt.

(7) Reinstall in the opposite sequence to removal.

(Precautions upon reinstalling)

1. Check and adjust the print head and platen after reinstalling the parts. (See 6.1)
2. When reinstalling the carriage plate ③, push it in the direction indicated by the arrow (against the carriage frame).



5.2.11 Pin Tractor Assembly

(1) Remove the upper cover assembly. (See 5.2.1)

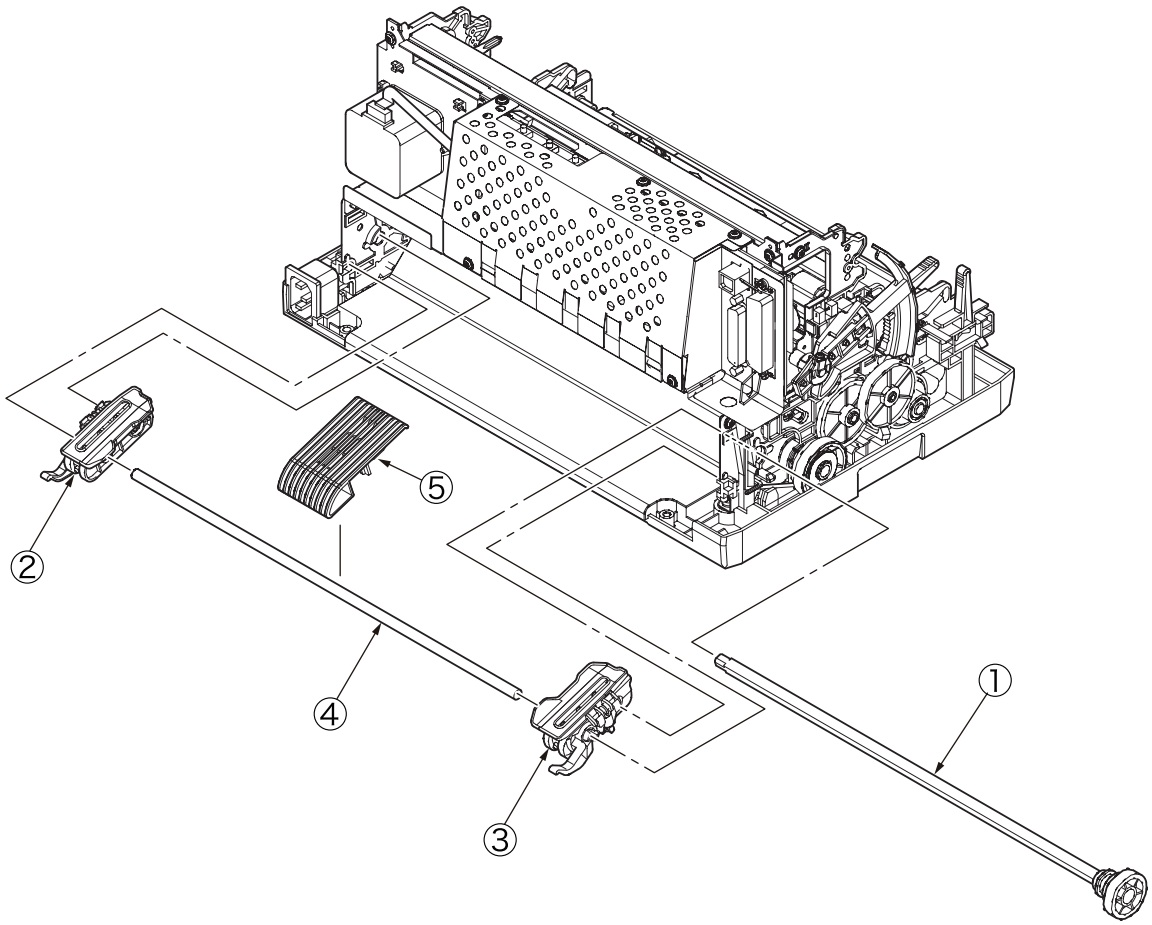
(2) Remove the tractor shaft ①.

(3) Remove the tractor assembly L ②, tractor assembly R ③, lock shaft ④, and center guide ⑤.

(4) Reinstall in the opposite sequence to removal.

(Precautions upon reinstalling)

1. When reinstalling the tractor shaft ①, the tractor assembly L ② must be in phase with the tractor assembly R ③.



5.2.12 Printer unit

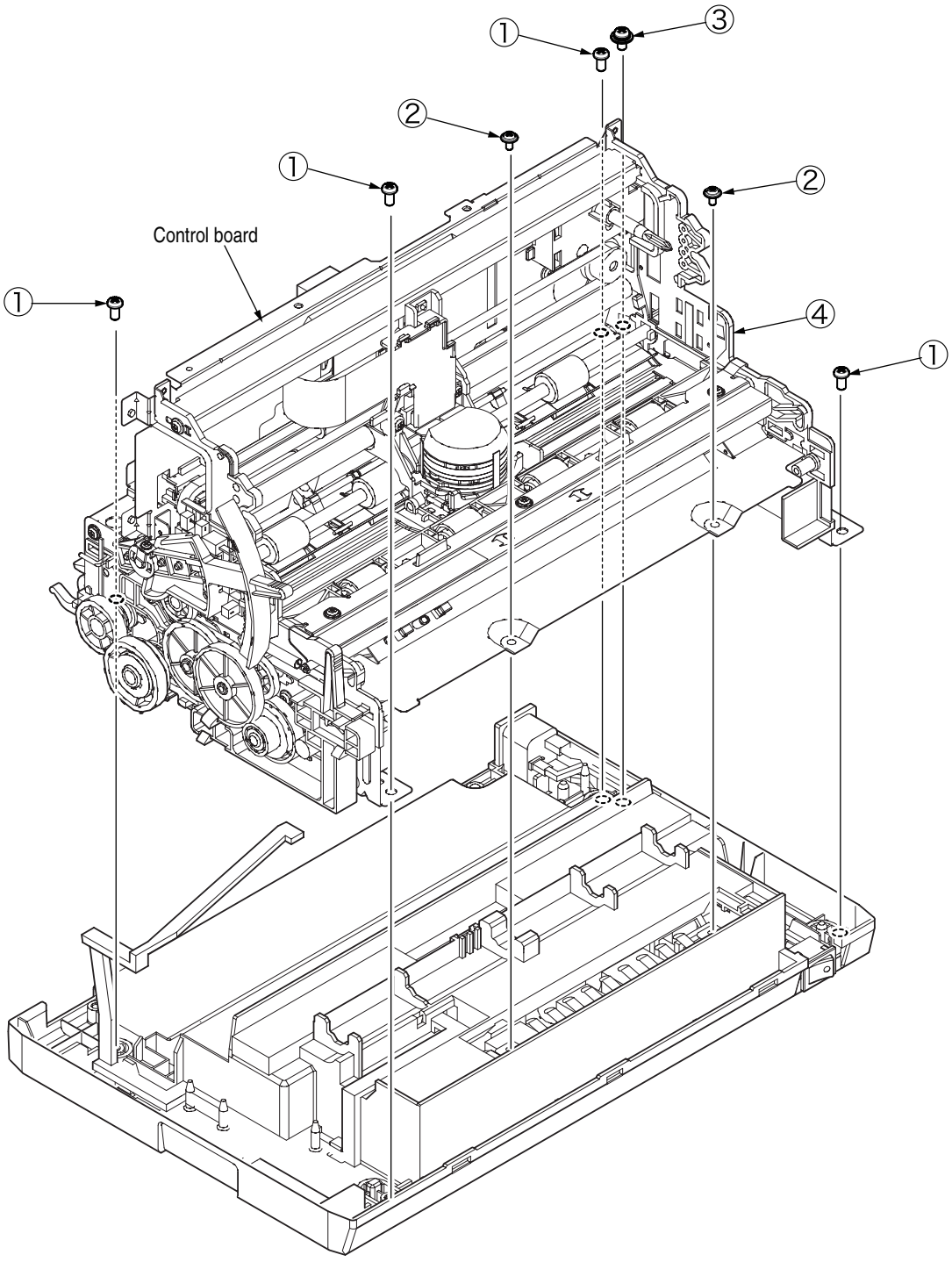
(1) Remove the upper cover assembly. (See 5.2.3)

(2) Remove the shield plate B and shield plate back. (See 5.2.4)

(3) Disconnect the connector (Power supply) from the control board.

(4) Remove the four screws ①, two screws ② and screw ③, then remove the printer unit ④.

(5) Reinstall in the opposite sequence to removal.



5.2.13 LF motor

(1) Remove the upper cover assembly. (See 5.2.3)

(2) Remove the printer unit. (See 5.2.12)

(3) Disconnect the LF motor connector from the control board.

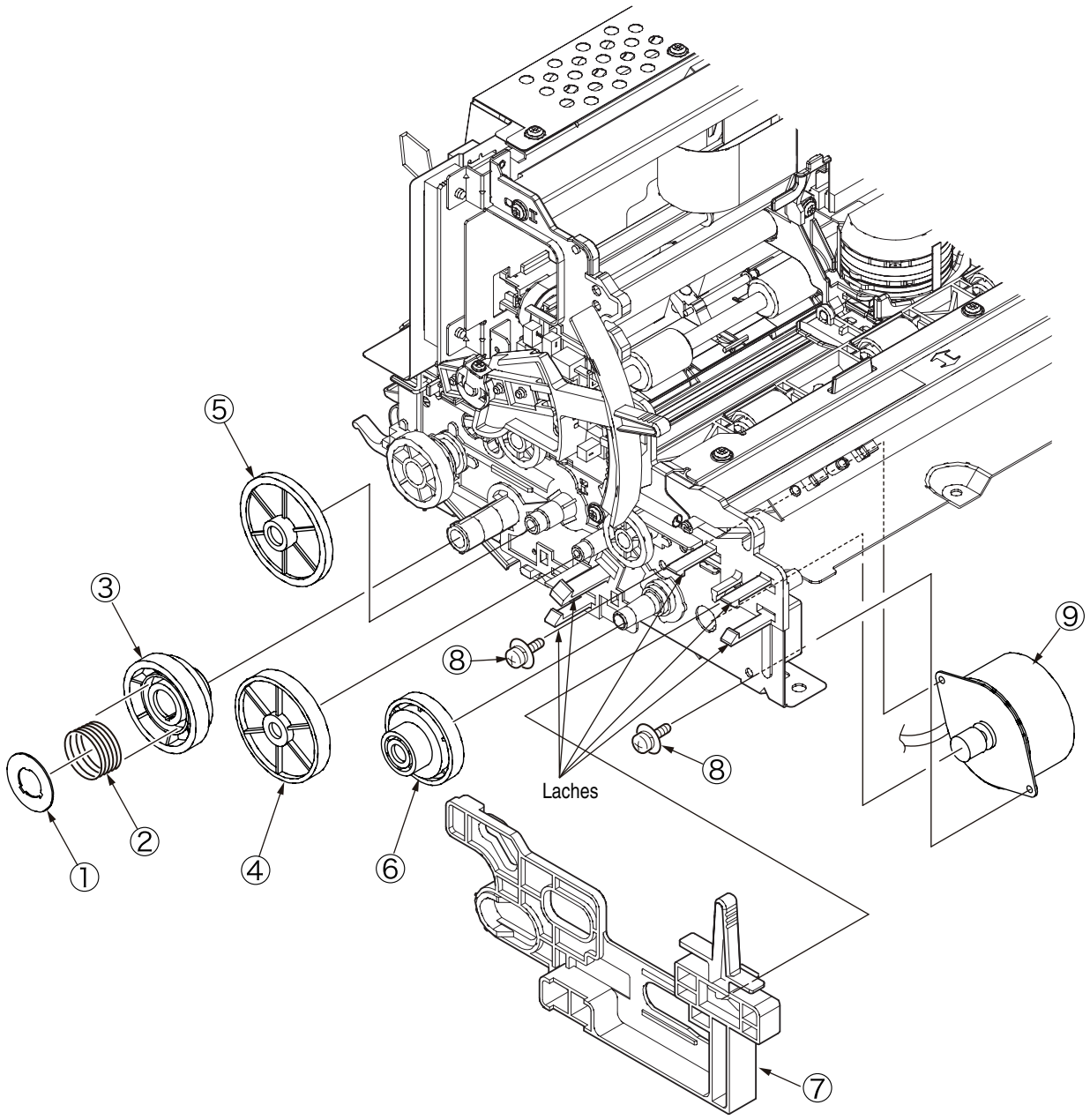
(4) Remove the washer ①, then remove the spring ② and change gear ③.

(5) Remove the idle gears ④, ⑤, and ⑥.

(6) Remove the five latches, then remove the change lever ⑦.

(7) Remove the two screws ⑧, then remove the LF motor ⑨.

(8) Reinstall in the opposite sequence to removal.



5.2.14 Table sensor, micro switch, photo sensor, sensor cord

(1) Remove the upper cover assembly. (See 5.2.3)

(2) Remove the printer unit. (See 5.2.12)

(3) Disconnect the sensor connector from the control board.

(4) Remove the screw ①, then remove the bush_adjust ② and lever_adjust ③.

(5) Remove the gap sensor 1 ④, gap sensor 2 ⑤, and carriage sensor ⑥.

(6) Remove the latch, then remove the sensor holder ⑦.

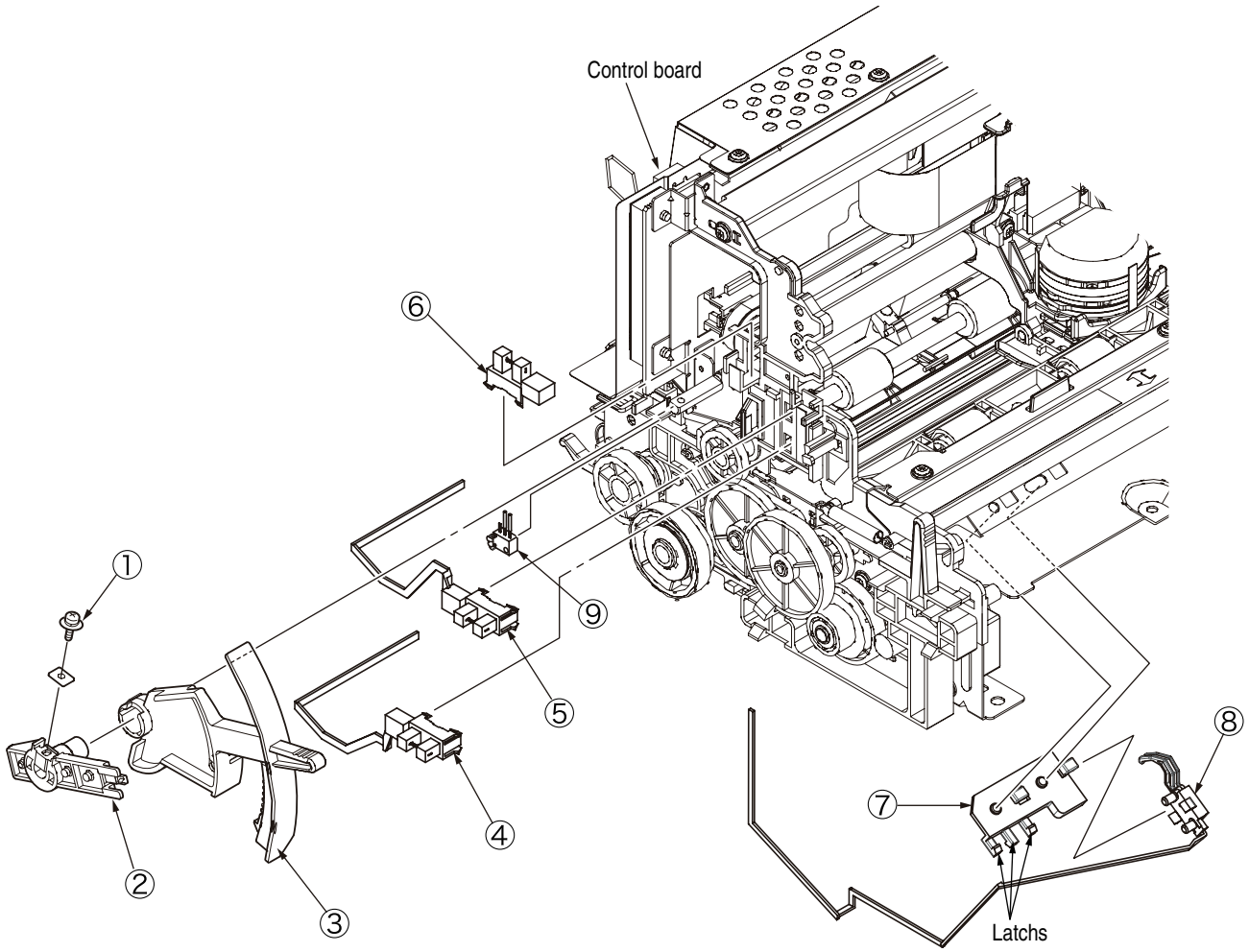
(7) Remove the table sensor ⑧ from the sensor holder ⑦.

(8) Disconnect the sensor cord ⑨ from the gap sensor 1 ④, gap sensor 2 ⑤, carriage sensor ⑥, table sensor ⑧.

(8) Reinstall in the opposite sequence to removal.

(Precautions upon reinstalling)

1. Check and adjust the print head and platen after reinstalling the parts. (See 6.1)



5.2.15 Power supply unit

⚠Warning	Risk of Electric Shock	⚠

There is a risk of electric shock during replacement of the low voltage power supply.

Use insulating gloves or avoid direct contact with any conducting part of the power supply, and caution should be exercised during replacement.

The capacitor may take one minute to complete discharge after the AC cord is unplugged. Also, there is a possibility that the capacitor doesn't discharge because of a breakage of the PCB, etc., so remember the possibility of electric shock to avoid electric shock.

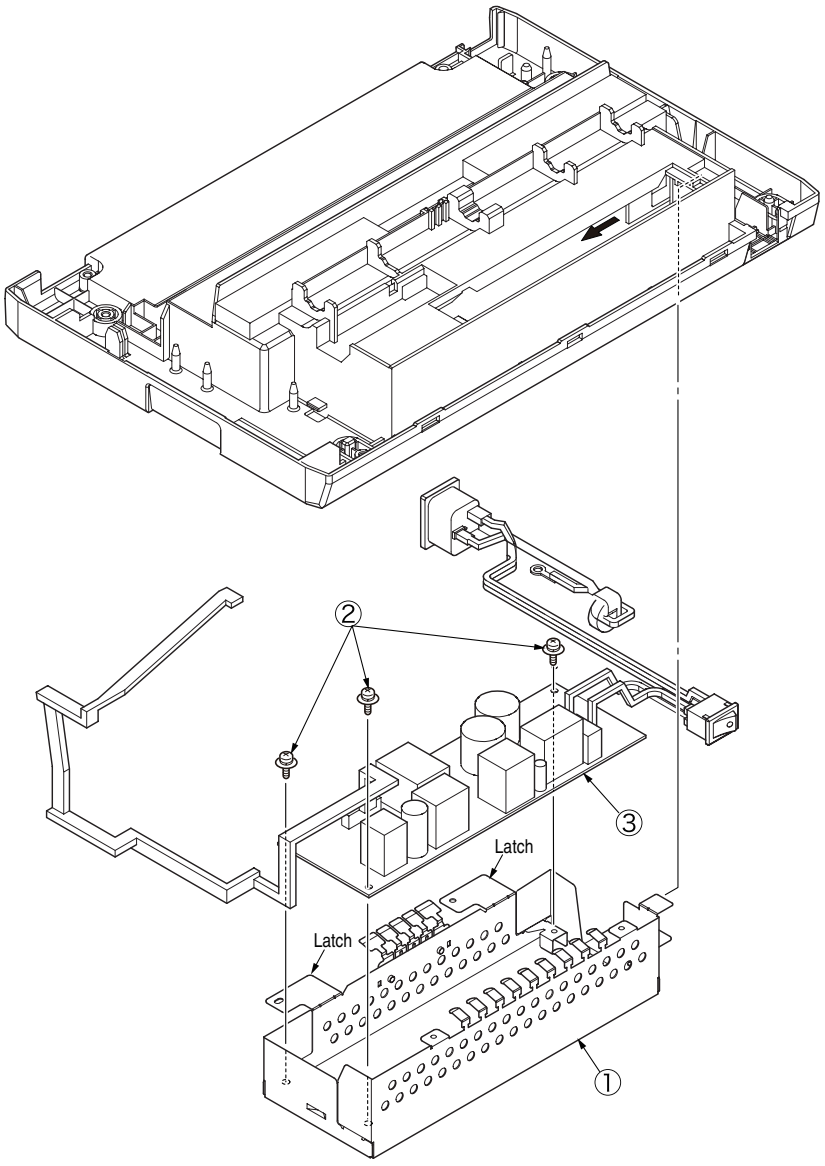
(1) Remove the upper cover assembly. (See 5.2.3)

(2) Remove the printer unit. (See 5.2.12)

(3) Remove the two latches , then move the shield plate_lower ① in the direction indicated by the arrow to remove it.

(4) Remove the three screws ②, then remove the power supply ③.

(5) Reinstall in the opposite sequence to removal.



6. ADJUSTING

- Adjustments must be made with the printer unit installed in the lower cover.
- Adjustments must be made by setting the printer on a secure assembly platform (plane level: 1mm or less) in order to minimize skewed adjustments.

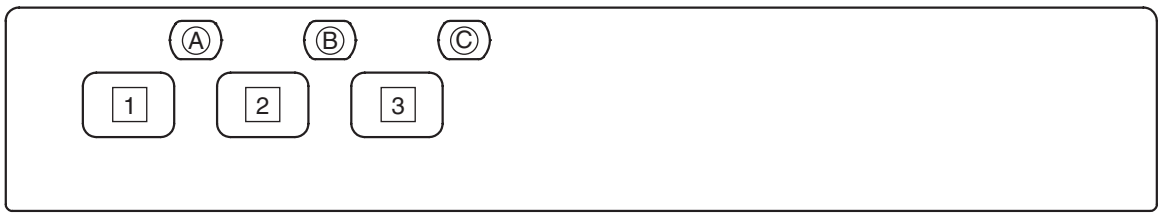
6.1 Adjusting the Gap Between the Platen and Print Head

Tools

- No. 2-200 Phillips screwdriver
- Thickness gauge

Adjusting Method

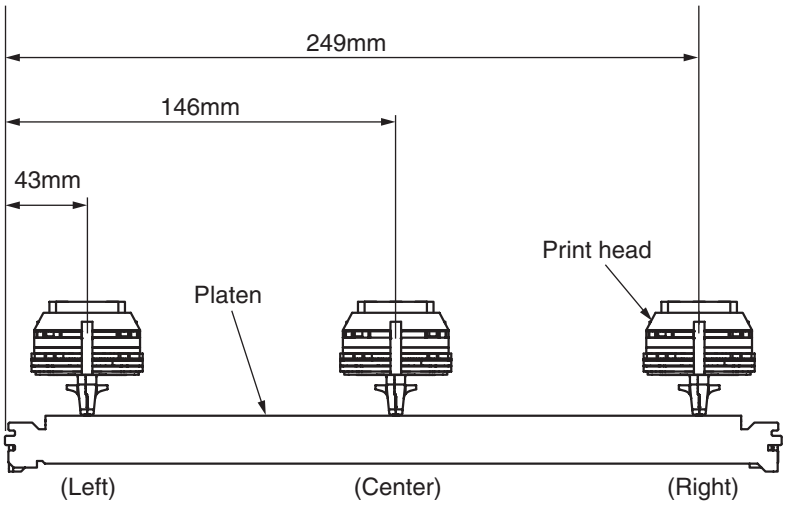
Allocation of switch lamps

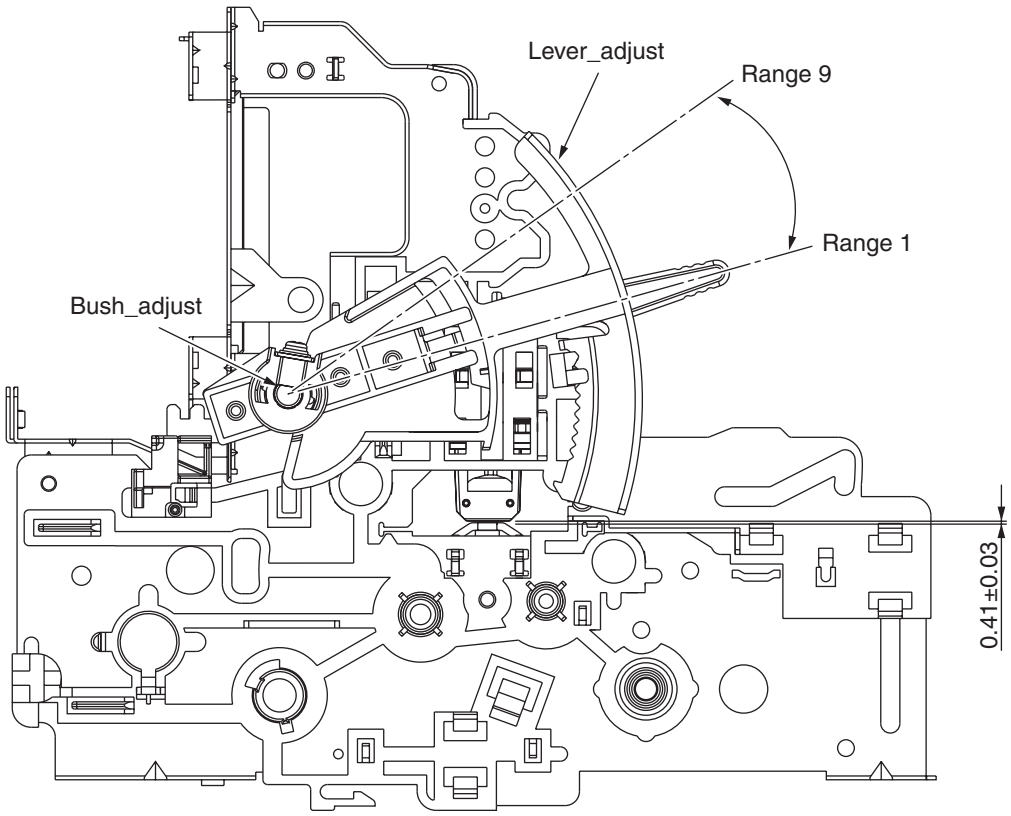


(1) Turn ON the power switch.
(2) Remove the upper cover assembly. (See 5.2.3)
(3) Remove the ribbon cartridge.
(4) Set the adjust lever to [Range 1].
(5) Rotate the bush_adjust to adjust the space between the printer head and platen so that it is 0.38-0.44 mm at the center an right and left ends of the platen.
(6) After adjusting, set the ribbon cassette, then set a continuous form of 55kg ream weight to the tractor.
(7) ML5100FB: Turn ON the power while pressing the switch [2] and confirm that a test print is performed properly.

CAUTION:

If the test print is not properly performed, check the gap adjustment values.

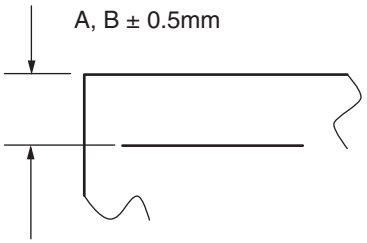




- Set the adjust lever to Range 1 for adjusting.
- Adjust the head gap by pressing the adjust lever lightly into the groove of the side frame so that there is no backlash between the adjust lever and groove.

6.2 First line position compensation

Specification



	First line position
Cut paper (Stage)	A±0.5mm
Continuous paper (Rear)	B±0.5mm

Adjusting Method

(1) A paper (1P 55kg paper) is set.
   1. A cut paper does after local printing mode carry out a paper set.
   2. Continuation paper is set to a rear tractor.

(2) A power supply is switched on pushing the key of a mentioned operation panel (Selection mode starting printing test)

(3) Local printing start.
   <ML5100FB>
   In the case of continuation paper ② of an operation panel key is pushed.
   In the case of cut sheet a paper is set on a table.

(4) POWER OFF

(5) Check going into a standard value.

(6) When not going into a standard value it rectifies according to a left table.

The method of compensation

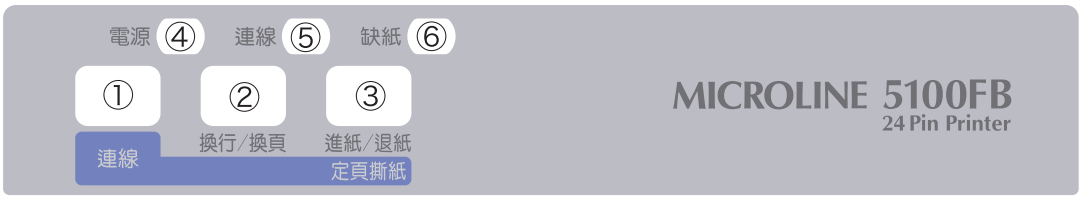
<ML5100FB>

A power supply is switched on pushing ③ (Menu mode).

An item is united by ① (or ① pushing ③) key.

A compensation value is chosen (or ② pushing ③) key.

If a target setting value is reached, ③ switch pushing, ① and ② switch are pushed simultaneously and it is made to complete.

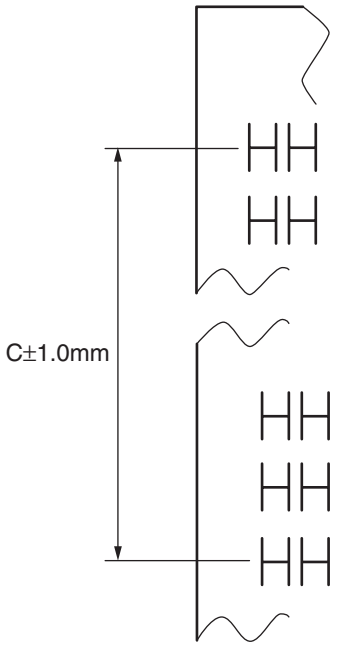


Adjusting Method

Preset	Correction
+7	Move 7/60 inch (2.96 mm) down from the reference position.
+6	Move 6/60 inch (2.54 mm) down from the reference position.
+5	Move 5/60 inch (2.12 mm) down from the reference position.
+4	Move 4/60 inch (1.69 mm) down from the reference position.
+3	Move 3/60 inch (1.27 mm) down from the reference position.
+2	Move 2/60 inch (0.85 mm) down from the reference position.
+1	Move 1/60 inch (0.42 mm) down from the reference position.
0	Reference position
-1	Move 1/60 inch (0.42 mm) up from the reference position.
-2	Move 2/60 inch (0.85 mm) up from the reference position.
-3	Move 3/60 inch (1.27 mm) up from the reference position.
-4	Move 4/60 inch (1.69 mm) up from the reference position.
-5	Move 5/60 inch (2.12 mm) up from the reference position.
-6	Move 6/60 inch (2.54 mm) up from the reference position.
-7	Move 7/60 inch (2.96 mm) up from the reference position.

6.3 The amount compensation of 40 lines

Specification



C=4.233 × 39=165.09mm

Adjusting Method

(1) PC for an examination is connected. It is made OKI mode.
(2) A paper (1P / 55kg) is set toa table.
(3) Examination data is printed from PC for an examination.
(4) Power supply OFF after printing.
(5) Check going into the standardvalue.
(6) When not going into a standard value, it rectifies according to a left table.

The method of compensation

<ML5100FB>

A power supply is switched on pushing ③ (Menu mode).

① switch (or while pushing ③ switches ① switch) is pushed, and an item is determined.

A compensation value is chosen ② (or ② pushing ③) key.

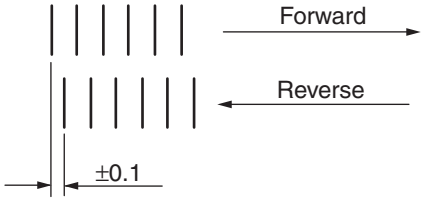
If a target setting value is reached, ③ switch pushing, ① and ② switch are pushed simultaneously and it is made to complete.

Preset	Correction
+14	Move 1 pitch (1/720”) forward every 55/360” from the reference position.
+13	Move 1 pitch (1/720”) forward every 59/360” from the reference position
+12	Move 1 pitch (1/720”) forward every 64/360” from the reference position
+11	Move 1 pitch (1/720”) forward every 69/360” from the reference position
+10	Move 1 pitch (1/720”) forward every 76/360” from the reference position
+9	Move 1 pitch (1/720”) forward every 85/360” from the reference position
+8	Move 1 pitch (1/720”) forward every 96/360” from the reference position
+7	Move 1 pitch (1/720”) forward every 109/360” from the reference position.
+6	Move 1 pitch (1/720”) forward every 127/360” from the reference position.
+5	Move 1 pitch (1/720”) forward every 153/360” from the reference position.
+4	Move 1 pitch (1/720”) forward every 191/360” from the reference position.
+3	Move 1 pitch (1/720”) forward every 255/360” from the reference position.
+2	Move 1 pitch (1/720”) forward every 382/360” from the reference position.
+1	Move 1 pitch (1/720”) forward every 764/360” from the reference position.
0	Reference position
-1	Move 1 pitch (1/720”) back every 764/360” from the reference position.
-2	Move 1 pitch (1/720”) back every 382/360” from the reference position.
-3	Move 1 pitch (1/720”) back every 255/360” from the reference position.
-4	Move 1 pitch (1/720”) back every 191/360” from the reference position.
-5	Move 1 pitch (1/720”) back every 153/360” from the reference position.
-6	Move 1 pitch (1/720”) back every 127/360” from the reference position.
-7	Move 1 pitch (1/720”) back every 109/360” from the reference position.
-8	Move 1 pitch (1/720”) back every 96/360” from the reference position.
-9	Move 1 pitch (1/720”) back every 85/360” from the reference position.
-10	Move 1 pitch (1/720”) back every 76/360” from the reference position.
-11	Move 1 pitch (1/720”) back every 69/360” from the reference position.
-12	Move 1 pitch (1/720”) back every 64/360” from the reference position.
-13	Move 1 pitch (1/720”) back every 59/360” from the reference position.
-14	Move 1 pitch (1/720”) back every 55/360” from the reference position.

6.4 Compensation of a printing gap of both directions

Specification

- Normal Speed ±0.1 mm or less
- High Speed ±0.1 mm or less
- Draft Speed ±0.15 mm or less
- HSD Speed ±0.15 mm or less



Correct print registration in the forward direction if the output is reversed.
Check the registration both on a cut sheet and a continuous form.

Adjusting Method

A test pattern is mode to print and it checks that the right and left direction printing gap is less than a standard value.
(Perform this adjustment and a check by the whole printing width.)

When not going into a standard value, it rectifies according to a left table.

The method of compensation

<ML5100FB>

A power supply is switched on pushing ③

① switch (or while pushing ③ switches ① switch) is pushed, and an item is determined.

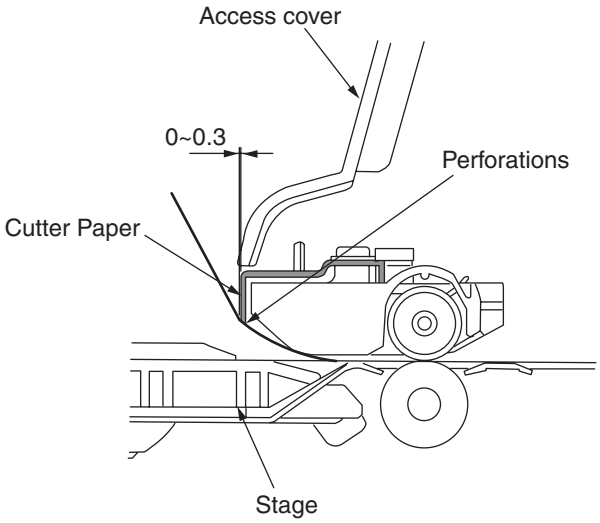
A compensation value is chosen ② (or ② pushing ③) key.

Preset	Correction
+10	Move 0.35 mm to the right from the reference position.
+9	Move 0.315 mm to the right from the reference position.
+8	Move 0.28 mm to the right from the reference position.
+7	Move 0.245 mm to the right from the reference position.
+6	Move 0.21 mm to the right from the reference position.
+5	Move 0.175 mm to the right from the reference position.
+4	Move 0.14 mm to the right from the reference position.
+3	Move 0.105 mm to the right from the reference position.
+2	Move 0.07 mm to the right from the reference position.
+1	Move 0.035 mm to the right from the reference position.
0	Reference position
-1	Move 0.035 mm to the left from the reference position.
-2	Move 0.07 mm to the left from the reference position.
-3	Move 0.105 mm to the left from the reference position.
-4	Move 0.14 mm to the left from the reference position.
-5	Move 0.175 mm to the left from the reference position.
-6	Move 0.21 mm to the left from the reference position.
-7	Move 0.245 mm to the left from the reference position.
-8	Move 0.28 mm to the left from the reference position.
-9	Move 0.28 mm to the left from the reference position.
-10	Move 0.35 mm to the left from the reference position.

6.5 Paper cut position compensation

Specification

- 0~0.3 mm



Adjusting Method

(1) Continuation paper (1p, 55kg, 10 inch) is set to a tractor
(2) Power supply
(3) After push ③ and feed paper, push ③ send a paper to a paper cut position and check that perforation stop within a standard value.

When not going into a standard value it rectifies according to a left table.
The method of compensation.

<ML5100FB>
A power supply is switched on pushing ③ switch. (Menu mode)

① switch (or while pushing ③ switches ① switch) is pushed, and an item is determined.

A compensation value is chosen ② (or ② pushing ③) key.

If a target setting value is reached, ③ switch pushing, ① and ② switch are pushed simultaneously and it is made to complete.

Preset	Correction
+7	Move 7/90 inch (1.98 mm) down from the reference position.
+6	Move 6/90 inch (1.69 mm) down from the reference position.
+5	Move 5/90 inch (1.41 mm) down from the reference position.
+4	Move 4/90 inch (1.13 mm) down from the reference position.
+3	Move 3/90 inch (0.85 mm) down from the reference position.
+2	Move 2/90 inch (0.56 mm) down from the reference position.
+1	Move 1/90 inch (0.28 mm) down from the reference position.
0	Reference position
-1	Move 1/90 inch (0.28 mm) up from the reference position.
-2	Move 2/90 inch (0.56 mm) up from the reference position.
-3	Move 3/90 inch (0.85 mm) up from the reference position.
-4	Move 4/90 inch (1.13 mm) up from the reference position.
-5	Move 5/90 inch (1.41 mm) up from the reference position.
-6	Move 6/90 inch (1.69 mm) up from the reference position.
-7	Move 7/90 inch (1.98 mm) up from the reference position.

7. MAINTENANCE TEST

7.1 Selecting the Test Mode

The switches on the operator panel have the functions indicated in Table 7-1 for ML5100FB so that various tests can be conducted for maintenance.
To start the test in Table 7-1 for ML5100FB, turn power ON while pressing the switch marked with the ○.
In maintenance mode 1, maintenance mode 2, or print test selection mode test, start the test in Table 7-2 for ML5100FB by pressing the switch marked with the ○ while at the same time holding down the switch marked with the ●.

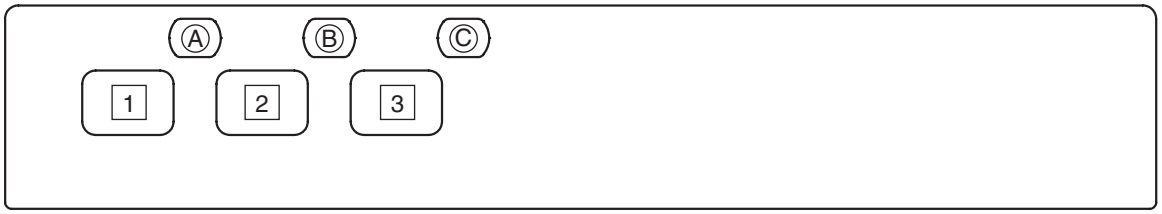
Table 7-1(ML5100FB)

Operator Panel Switch			Test Items
1	2	3	
	○		6 inch per pattern
	○	○	All letter test
		○	Menu mode. (See 7.2) (Chinese)
○		○	Function setup menu default setting (Note 2)
○	○		Maintenance mode 1
○	○	○	Maintenance mode 2
○			Print test selection mode

Table 7-2(ML5100FB)

Modes	Operator Panel Switch			Test Items
	1	2	3	
Maintenance mode 1	●		○	Menu mode. (See 7.2) (English)
	○		●	Correction of horizontal print position (Chinese)
		○	●	Correction of horizontal print position (English)
		●	○	Sensor check mode
	○	●		8 inch/continuous pattern
Maintenance mode 2		●	○	Flash loading mode
Print test selection mode		●	○	Skip/continuous pattern
	○	●		Hexadecimal dump (Note 1)

Allocation of switch lamps



Caution:

1. Hexadecimal dump is a mode in which all data sent from the host computer to the printer are printed in hexedecimal.
2. With [function setup menu default setting] items excluding the mechanism correction value will return to default.

7.2 Setting the Menu

7.2.1 Items in the menu

(1) English indication

Underlined values are by default.
Non-underlined values are in accordance to adjustment at the factory.

Item	Function	Set Value
Chinese character mode (power-on)	Selects whether to set or release Kanji mode upon power ON. (This function is valid only upon power ON and is invalid upon receiving I-PRIME.)	ON OFF
Receive buffer size	Selects receive buffer or size.	0 64K
Character code	Selects the ANK character code table.	Graphics Italics
Paper length	Selects the paper length.	279.4mm(11 Inch) 296.3mm(11 2/3 Inch) 304.8mm(12 Inch) 355.6mm(14 Inch) 431.8mm(17 Inch) 76.2mm(3 Inch) 84.7mm(10/3 Inch) 88.9mm(3.5 Inch) 93.1mm(11/3 Inch) 101.6mm(4 Inch) 127.0mm(5 Inch) 139.7mm(5.5 Inch) 152.4mm(6 Inch) 177.8mm(7 Inch) 203.2mm(8 Inch) 215.9mm(8.5 Inch)
Skip over perforation	Selects the length for skipping over perforation. (When the skip over perforation setup command is received, the received command is given priority.)	OFF 25.4mm (1 Inch)
Print quality	Selects the print quality for ANK code.	LQ Draft
CR code	Selects operation upon receiving CR codes.	CR CR+LF
PE detection	Selects present or non-present for media paper-end detection.	ON OFF
FF Function	Selects the feed operation upon receiving the FF code after feeding cut-sheets.	Eject Form Feed
Cut position adjust	Selects the adjustment value of the cut position for paper cut operation on the rear side of continuous forms. (In 1/90-inch increment.)	-7~-1 0 +7~+1
TOF (cut sheet)	Selects the reference position for printing the first line when feeding cut-sheet in manual mode. (Up to the mid-section of characters in the first line.) "User top of form" will be printed if the print position of the first line is set.	2.12mm(1/12Inch) 4.23mm(2/12Inch) 6.35mm(3/12Inch) 8.47mm(4/12Inch) 10.58mm(5/12Inch) 12.7mm(6/12Inch) 14.82mm(7/12Inch) 16.93mm(8/12Inch) 19.05mm(9/12Inch) 21.17mm(10/12Inch) 23.28mm(11/12Inch) 25.4mm(12/12Inch) 27.52mm(13/12Inch) User top of form

Underlined values are by default.
Non-underlined values are in accordance to adjustment at the factory.

Item	Function	Set Value
TOF Adjust (cut sheet)	Selects the adjustment value for the reference position for printing the first line with cut-sheet. The position is moved in 1/60-inch increment to the trailing end for [+] and leading end for [-].	-7~-1 0 +7~+1
TOF (continuous)	Selects the reference position for printing the first line upon auto loading from continuous form rear side. (Up to the mid-section of characters in the first line.) "User top of form" will be printed if the print position of the first line is set.	2.12mm(1/12Inch) 4.23mm(2/12Inch) 6.35mm(3/12Inch) 8.47mm(4/12Inch) 10.58mm(5/12Inch) 12.7mm(6/12Inch) 14.82mm(7/12Inch) 16.93mm(8/12Inch) 19.05mm(9/12Inch) 21.17mm(10/12Inch) 23.28mm(11/12Inch) 25.4mm(12/12Inch) 27.52mm(13/12Inch) User top of form
TOF Adjust (continuous)	Selects the adjustment value for the reference position for printing the first line with continuous forms. The position is moved in 1/60-inch increment to the trailing end for [+] and leading end for [-].	-7~-1 0 +7~+1
Cut sheet auto eject position	Selects the printable area on the bottom edge of cut-sheet paper during cut-sheet mode.	6.35mm 14.8mm
Zero character	Selects the print font pattern when receiving 30H ANK code.	0 (Unslashed) Ø (Slashed)
Print direction (double height mode)	Selects the print direction when a double-height print data exists in a line.	Bidirectional Unidirectional
Table print	Selects whether to print by splitting a pass when a print job by the same head pin continues for 3 inches or more within a print block.	Standard Special
Compress Width	Sets the compression rate.	100% 75% 50%
Wait time	Selects the waiting time from when paper is set on the table to when it is fed upon cut-sheet manual feed mode.	0.5 sec 1.0 sec 2.0 sec
Paper position (power-on)	Selects the paper position when paper exists at power ON. (For continuous form only.)	Print position Cut position
Form Tear-off	Selects Auto or Manual as the feed method to the position for cutting the perforation with continuous forms.	OFF 0.5sec 1.0sec 2.0sec
Chinese code map	Select the Chinese code map	NS code BIG-5 code TCA code IBM5550 code DCI code

Underlined values are by default.
Non-underlined values are in accordance to adjustment at the factory.

Item	Function	Set Value
Chinese font style	Selects the Chinese font style.	Ming ti Hei ti Ku ti Li ti
ASCII Font style	Selects the ANK font. (When a font is designated by the ANK font designation command, the command must be followed.)	Roman Courier
Print direction command	Selects whether the single direction print setup command is valid or invalid.	Valid Invalid
Cut sheet LF adjust	Adjusts the amount for line feed during cut-sheet mode.	-14~-1 0 +14~+1
Continuous paper LF adjust	Corrects the amount of line feed in the continuous paper mode.	-2,-1,0,+1,+2
Centering for feed	Specifies the centering position for line feed. • Mode1 Centering to the position of the 8th character to feed more than three-range of rear continuous paper or 2/3 inches (default). • Mode2 Centering to the position of the 5th character to feed more than three-range of rear continuous paper or 2/3 inches. • Mode3 Centering to the position of the 8th character to feed either continuous paper or cut sheets. • Mode4 Do not do centering by feed.	Model1 Model2 Model3 Model4
Power Saving mode	Selects whether to validate or invalidate the power save mode.	Valid Invalid
Power Save Time	Sets the idling time to switch to power save when the power save mode is valid.	5 min 10 min 15 min 30 min 60 min
Print style	Selects the setup status for the high-copy and High-Speed and low noise print mode upon power ON. (This item is not referred to for initialization other than initialization commands, I-PRIME, and power ON.)	Normal High speed Emphasis1 Emphasis2 Quiet
High speed printing	In High-Speed mode, uses the switch to select a speed setting.	High speed Super speed
Draft font speed	Selects the draft ANK10CPI print speed.	Normal speed High speed
Pitch	Sets the character pitch for ANK charavters.	10CPI 12CPI 15CPI 17.1CPI 20CPI
Proportional Spacing	Sets whether to enable or disable the proportional font spacing.	No Yes
Kanji Font Space	Sets the space between Kanji characters.	3dot 0dot

Underlined values are by default.
Non-underlined values are in accordance to adjustment at the factory.

Item	Function	Set Value
Line Spacing	Sets the line spacing.	6LPI 8LPI
Font Size	Sets each font size for ANK characters and Kanji characters.	Normal Double width Double height 4 times
I/F Bi-directional	Sets whether to validate or invalidate the returned device ID from IEEE1284.	Valid Invalid
I/F Timing	Sets the timing for data latch and the timing to output the ACK signals and Busy signals in Centronics IF.	A-B A-B-A
Host Interface	Selects the interface setting.	Auto Interface Parallel USB
I/F Time Out	Sets the time-out time for Auto Interface.	15 sec 30 sec 45 sec 1 min 2 min 3 min 4 min 5 min
Auto Feed XT	Sets whether to validate or invalidate the Auto Feed XT singles.	Valid Invalid
Position check	Switch settings of position check for the head position (homing). Check1 • When switching from Offline to Online by pressing SW • When canceling the power save mode Check2 Check the position when the standard setting is set and the followings occasions • When printing is started by data reception after status with no operation such as printing continues more than three minutes • When cut sheet feeding or continuous paper auto loading (before loading) Check 3 Checks the head position when the ejection of cut-sheet paper or backward feed of continuous paper is completed.	Check1 Check2 Check3
SP Check	Set whether to validate or invalidate operation to check the absolute position of the head during printing on rear continuous paper.	Valid Invalid
Slack Adjust (continuous)	Sets whether to perform paper slack removal control in rear tractor mode.	Valid Invalid
Centering for paper top (continuous)	Selects whether to apply centering before each carriage return until the top edge of continuous forms passes through the rear feed roller.	Valid Invalid
Image Print Speed	Selects the image print speed. In “Normal” mode, the print speed is decreased.	Normal Special

Underlined values are by default.
Non-underlined values are in accordance to adjustment at the factory.

Item	Function	Set Value
Multipart form print mode	Selects the high copying capacity mode for multipart forms. In "Special" mode, the print speed is decreased to 50% with the gap range of 3 or more.	Normal Special
PE detection (continuous)	Selects the paper end occurring condition in the continuous mode. If “Normal” is selected, the printer detects paper end with no paper fed. If “Special” is selected, the printer is on-line with no paper fed.	Normal Special
Carriage Position when cut sheet Gap 1	Selects the carriage position when feeding a cut-sheet paper (Gap range 1).	Left Middle Right
Carriage Position when cut sheet Gar >1	Selects the carriage position when feeding a cut-sheet paper (Gap range 2 or more).	Left Middle Right
Paper Width Mode	Selects the width of continuous paper to be used. Selects [Mode1] if using paper which width is 8 inch or more. Selects [Mode2] if using paper which width is from less than 8 inch to 5 inch or more. Selects [Mode3] if using paper which width is less than 5 inch.	Mode1 Mode2 Mode3
Continuous paper top LF adjust Gap 1	Selects the LF adjustment amount when the continuous paper top passes over the front feed roller. (Gap range 1) Adds the adjustment amount to the linefeed amount in the case of +. Subtracts the adjustment amount from the linefeed amount in the case of -. The unit of adjustment amount is 1/360 inch (0.0705mm).	+3~+1 0 -3~-1
Continuous paper top LF adjust Gap 2	Selects the LF adjustment amount when the continuous paper top passes over the front feed roller. (Gap range 2) Adds the adjustment amount to the linefeed amount in the case of +. Subtracts the adjustment amount from the linefeed amount in the case of -. The unit of adjustment amount is 1/360 inch (0.0705mm).	+3~+1 0 -3~-1
Continuous paper top LF adjust Gap 3	Selects the LF adjustment amount when the continuous paper top passes over the front feed roller. (Gap range 3) Adds the adjustment amount to the linefeed amount in the case of +. Subtracts the adjustment amount from the linefeed amount in the case of -. The unit of adjustment amount is 1/360 inch (0.0705mm).	+3~+1 0 -3~-1

Underlined values are by default.
Non-underlined values are in accordance to adjustment at the factory.

Item	Function	Set Value
Continuous paper top LF adjust Gap 4	Selects the LF adjustment amount when the continuous paper top passes over the front feed roller. (Gap range 4) Adds the adjustment amount to the linefeed amount in the case of +. Subtracts the adjustment amount from the linefeed amount in the case of -. The unit of adjustment amount is 1/360 inch (0.0705mm).	+3~+1 0 -3~-1
Parity	Selects the presence or absence of an even or odd parity bit.	None Odd Even Ignore
Serial Data 7/8 Bits	Selects the data bit length.	8 bit 7 bit
Protocol	Selects the method of controlling I/F Busy.	DTR X-ON/X-OFF DTR& X-ON/X-OFF
Diagnostic Test	Selects whether to perform a diagnostic test for input/output of RS-232C I/F signals.	No Yes
Baud Rate	Selects the data transfer rate.	9,600 bps 4,800 bps 2,400 bps 1,200 bps 600 bps 300 bps 19,200 bps
DTR Signal	Selects whether to switch the DTR signal in the serial I/F by choosing Select/Deselect or to hold it after power on.	Ready on Power UP Ready on Select
Busy Time	Sets the minimum transition time from "Busy" to "Ready".	0.2 sec 1.0 sec
Print registration (HSD speed)	Adjusts the print-start position during reverse direction print. Moves to the left and right in 1/720-inch increment by switch operation.	Displayed in vertical line print.
Print registration (Draft speed)	Adjusts the print-start position during reverse direction print. Moves to the left and right in 1/720-inch increment by switch operation.	Displayed in vertical line print.
Print registration (High speed)	Adjusts the print-start position during reverse direction print. Moves to the left and right in 1/720-inch increment by switch operation.	Displayed in vertical line print.
Printregistration (Normal speed)	Adjust sthe print-start position during reverse direction print. moves to the left and right in 1/720-inch increment by switch operation.	Displayed in vertical line print.

(2) Chinese indication

Underlined values are by default.
Non-underlined values are in accordance to adjustment at the factory.

Item	Function	Set Value
中文模式 (開機)	Selects whether to set or release Kanji mode upon power ON. (This function is valid only upon power ON and is invalid upon receiving I-PRIME.)	是 否
緩衝區大小	Selects receive buffer or size.	64K 0
字元模式	Selects the ANK character code table.	圖形 斜體
頁面長度	Selects the paper length.	279.4 公釐 (11 英寸) 296.3 公釐 (11 2/3 英寸) 304. 8 公釐 (12 英寸) 355.6 公釐 (14 英寸) 431.8 公釐 (17 英寸) 76.2 公釐 (3 英寸) 84.7 公釐 (10/3 英寸) 88.9 公釐 (3. 5 英寸) 93.1 公釐 (11/3 英寸) 101.6 公釐 (4 英寸) 127.0 公釐 (5 英寸) 139.7 公釐 (5.5 英寸) 152.4 公釐 (6 英寸) 177.8 公釐 (7 英寸) 203.2 公釐 (8 英寸) 215.9 公釐 (8.5 英寸)
跨越折縫	Selects the length for skipping over perforation. (When the skip over perforation setup command is received, the received command is given priority.)	關 25.4 公釐 (1 英寸)
列印品質	Selects the print quality for ANK code.	信函體 草體
回車處理	Selects operation upon receiving CR codes.	回車 回車 + 換行
無紙偵測	Selects present or non-present for media paper-end detection.	偵測 不偵測
換頁功能	Selects the feed operation upon receiving the FF code after feeding cut-sheets.	退紙 換頁
定頁撕紙調整	Selects the adjustment value of the cut position for paper cut operation on the rear side of continuous forms. (In 1/90-inch increment.)	-7 ～ -1 0 +7 ～ +1
紙張頂端位置 (單張紙)	Selects the reference position for printing the first line when feeding cut-sheet in manual mode. (Up to the mid-section of characters in the first line.) " 使用者定義 " will be printed if the print position of the first line is set.	2.12 公釐 (1/12 英寸) : 6.35 公釐 (3 /12 英寸) : 27.52 公釐 (13/12 英寸) 使用者定義

Underlined values are by default.
Non-underlined values are in accordance to adjustment at the factory.

Item	Function	Set Value
紙張頂端位置調整 (單張紙)	Selects the adjustment value for the reference position for printing the first line with cut-sheet. The position is moved in 1/60-inch increment to the trailing end for [+] and leading end for [-].	-7 ～ -1 0 +7 ～ +1
紙張頂端位置 (連續報表紙)	Selects the reference position for printing the first line upon auto loading from continuous form rear side. (Up to the mid-section of characters in the first line.) " 使用者定義 " will be printed if the print position of the first line is set.	2.12 公釐 (1/12 英寸) ： 6.35 公釐 (3 /12 英寸) ： 27.52 公釐 (13/12 英寸) 使用者定義
紙張頂端位置調整 (連續報表紙)	Selects the adjustment value for the reference position for printing the first line with continuous forms. The position is moved in 1/60-inch increment to the trailing end for [+] and leading end for [-].	-7 ～ -1 0 +7 ～ +1
單張紙自動退紙位置	Selects the printable area on the bottom edge of cut-sheet paper during cut-sheet mode.	6.35 公釐 14.8 公釐
零字元字體	Selects the print font pattern when receiving 30H ANK code or AA30H single-byte code.	0 (無斜槓) ø (斜槓)
列印方向 (倍高方式)	Selects the print direction when a double-height print data exists in a line.	雙向 單向
表格列印方式	Selects whether to print by splitting a pass when a print job by the same head pin continues for 3 inches or more within a print block.	標準列印 特殊列印
壓縮率	Sets the compression rate.	100% 75% 50%
送紙等待時間	Selects the waiting time from when paper is set on the table to when it is fed upon cut-sheet manual feed mode.	0.5 秒 1.0 秒 2.0 秒
列印紙張位置 (開機)	Selects the paper position when paper exists at power ON. (For continuous form only.)	列印位置 定頁撕紙位置
定頁撕紙	Selects Auto or Manual as the feed method to the position for cutting the perforation with continuous forms.	手動 0.5 秒 1.0 秒 2.0 秒
中文內碼	Selects the Chinese code map	國標碼 BIG-5 碼 公會 碼 IBM5550 碼 電信碼
中文字體類型	Selects the Chinese font style (in these two sections only).	明體 黑體 楷書 隸書
ASCII 字體類型	Selects the ANK font. (When a font is designated by the ANK font designation command, the command must be followed.)	Courier Roman
列印方向控制指令	Selects whether the single direction print setup command is valid or invalid.	有效 無效
單張紙換行量調整	Adjusts the amount for line feed during cut-sheet mode.	-14 ～ -1 0 +14 ～ +1

Underlined values are by default.
Non-underlined values are in accordance to adjustment at the factory.

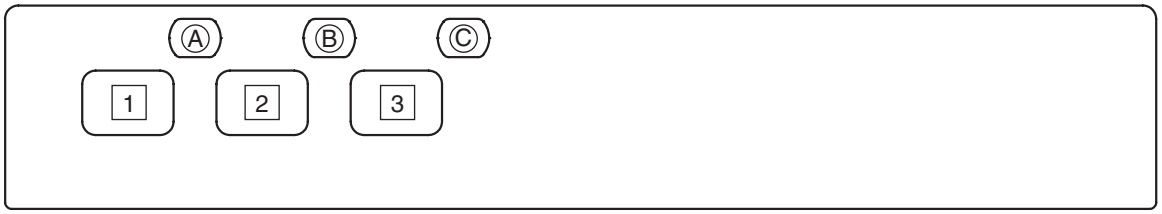
Item	Function	Set Value
列印方式	Selects the setup status for the high-copy and High-Speed and low noise print mode upon power ON. (This item is not referred to for initialization other than initialization commands, I-PRIME, and power ON.)	一般列印 高速列印 加重 1 加重 2 低噪音
高速列印	In High-Speed mode, uses the switch to select a speed setting.	高速 超高速
草稿速度	Selects the draft ANK10CPI print speed.	一般 高速
ANK 文字方式	Sets the character pitch for ANK charavters.	10 CPI 12 CPI 15 CPI 17.1 CPI 2.0 CPI
比例間距	Sets whether to enable or disable the proportional font spacing.	無效 有效
漢字文字間距	Sets the space between Kanji characters.	3 點距 0 點距
行間距	Sets the line spacing.	6 LPI 8 LPI
字元尺寸	Sets each font size for ANK characters and Kanji characters.	正常 橫向 2 倍 縱向 2 倍 4 倍
單頁進紙列印頭台架位置 (列印頭間隙 1)	Selects the carriage prition when feeding a cut-sheet paper(Gap range 1).	左 中央 右
單頁進紙列印頭台架位置 (列印頭間隙 >1)	Selects the carriage prition when feeding a cut-sheet paper(Gap range 2 or more).	左 中央 右
紙張寬度模式	selects the width of continuous paper to be used. Selects[Mode1]if using paper which width is 8 inch or more. Selects[Mode2]if using paper which width is from less than 8 inch to 5 inch or more. Selects[Mode2]if using paper which width is from less than 5 inch.	模式 1 模式 2 模式 3
連續報表紙紙頂換行調整 (頭間隙 1)	Selects the LF adjustment amount when the continuous paper top passed over the front feed roller.(Gap range1)Add the adjustment amount to the linefeed amount in the case of +. Subtracts the adjustment amount from the linefeed amount in the case of -. The unit of adjustment amount is 1/360 inch(0.0705mm)	+3 ～ +1 0 -3 ～ -1
連續報表紙紙頂換行調整 (頭間隙 2)	Selects the LF adjustment amount when the continuous paper top passed over the front feed roller.(Gap range2)Add the adjustment amount to the linefeed amount in the case of +. Subtracts the adjustment amount from the linefeed amount in the case of -. The unit of adjustment amount is 1/360 inch(0.0705mm)	+3 ～ +1 0 -3 ～ -1

Underlined values are by default.
Non-underlined values are in accordance to adjustment at the factory.

Item	Function	Set Value
連續報表紙紙頂換行調整 (頭間隙 3)	Selects the LF adjustment amount when the continuous paper top passed over the front feed roller.(Gap range3)Add the adjustment amount to the linefeed amount in the case of +. Subtracts the adjustment amount from the linefeed amount in the case of -. The unit of adjustment amount is 1/360 inch(0.0705mm)	+3 ～ +1 0 -3 ～ -1
連續報表紙紙頂換行調整 (頭間隙 4)	Selects the LF adjustment amount when the continuous paper top passed over the front feed roller.(Gap range4)Add the adjustment amount to the linefeed amount in the case of +. Subtracts the adjustment amount from the linefeed amount in the case of -. The unit of adjustment amount is 1/360 inch(0.0705mm)	+3 ～ +1 0 -3 ～ -1
序列介面傳輸檢查	Selects the presence or absence of an even or odd parity bit.	無 奇數 偶數 略過
序列介面資料 7/8 位元	Selects the data bit length.	8 位元 7 位元
序列介面定義	Selects the method of controlling I/F Busy.	DTR X-ON/X-OFF DTR& X-ON/X-OFF
序列介面自我診斷	Selects whether to perform a diagnostic test for input/output of RS-232C I/F signals.	無效 有效
序列介面傳輸速度	Selects the data transfer rate.	9,600 bps 4,800 bps 2,400 bps 1,200 bps 600 bps 300 bps 19,200 bps
序列介面 DTR 信號	Selects whether to switch the DTR signal in the serial I/F by choosing Select/Deselect or to hold it after power on.	開機時固定 連線 / 離線切換
列介面最短工作時間	Sets the minimum transition time from "Busy" to "Ready".	0.2 秒 1.0 秒

7.2.2 Setting the menu

Allocation of switch lamps



(1) Turn OFF power.

(2) Load paper (ream weight of 55kg; cut-sheet) and the ribbon cartridge into the printer to prepare the printer.

(3) Turn On power while pressing switch 1 and 2 simultaneously to print in English, or while pressing switch 3 to print in Chinese.

In case of Chinese mode please keep the switch pressed until the print head begins moving.

In case of English mode please keep the switches pressed until start to blink the lamp Ⓑ .

(4) To print in English,press switch 3 while holding switch 1 after the lamp Ⓑ blink.

(5) The printer will print either “Menu print?” or “ 列印功能表 ?” Press switch 2 to print all current menu settings.

(6) Press switch 1. to print the menu options from left to right. (To print in the reverse order, press switch 1. while holding down switch 3.)

(Example)

CR code	CR	
		◀ Switch 1 is pressed.
Pe detect	ON	
		◀ Switch 1 is pressed.
Cat position adjust	0	

Repeatedly press switch 1 (while holding down switch 3) until the printer prints the desired menu option.

(7) When the printer prints the desired menu option, press switch 2 (while holding down switch 3). Press the switch repeatedly to cycle through all available menu settings.

(Example)

CR code	CR	
		◀ Switch 2 is pressed
CR code	CR+LF	

Press switch 2 (while holding down switch 3) repeatedly until the printer prints the desired menu setting.

(8) Press switch 1. (while holding down switch 3) and repeat the above steps until you have changed all desired menu settings.

(9) To complete menu setting, press switch 2 while holding down switch 3, then press switch 1. (i.e., depress all three switches). The printer will print “Save menu” or “ 儲存功能表 ” then perform the same initialization as at power ON.

The last printed settings are stored in the printer.

Caution:

- If paper runs out during menu setting, reload paper and press switch 1 to proceed with setting.
- To save settings, press switch 2 while holding down switch 3, then press switch 1. If the power is turned off before this is done, the settings will not be saved.
- Please note that the displayed menu options differ between English and Chinese. (The English menu provides more menu options.) Do not change these menu settings unless you need to use the printer under unusual circumstances. Normally, use the printer with its factory default configuration.

8. PROCEDURES FOR REPAIRING

(1) Before repairing

When repair is requested from a customer, confirm whether the problem can be recovered by the methods described in "Measures for Problems" in the Instruction Manual in advance.

If possible, obtain information of how the problem occurred and write it down.

Before applying measures, operate the printer in the same condition as when the problem was generated and check if the problem still occurs. If the problem does not occur, start searching for the problem by performing test prints.

(2) Searching for what caused the problem

As for the method in searching for the cause of a problem, first confirm the alarm display in Table 8-1, check how the problem generated using Table 8-2, and confirm the specific contents of the problem. Next, search for the problem according to the detailed procedures.

Before repairing the problem, please acknowledge the precautions described in Section 5.1.

(3) Lamp display during a problem

When a problem is generated in this printer, the content of the problem is notified by the lamps in the operation unit. The problem is notified by the blinking of Lamp Ⓑ and Lamp Ⓒ .

• Display content

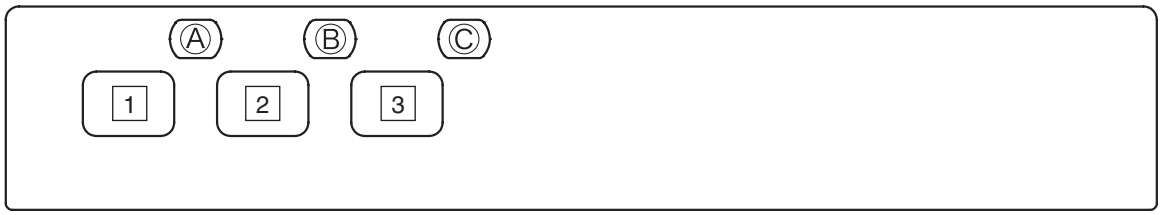
Table 8-1

Main Blink	Sub Blink	Alarm Content	Remedy
1	1	Homing error	See section ⑥.
	2	Spacing error	
2	1	Program ROM error	Replace the LFT print circuit board.
	2	CG ROM error	
	3	Flash ROM error	
3	1	DRAM error	
4	1~9	CPU error	
5	1	F/W alarm	
	2~5	Flash loading error	
9	1	Head A/D error	Replace the LFT print circuit board or print head.
	2	Space motor driver thermistor error	Replace the LFT print circuit board.
	3	Control board thermistor error	

(4) Items to search

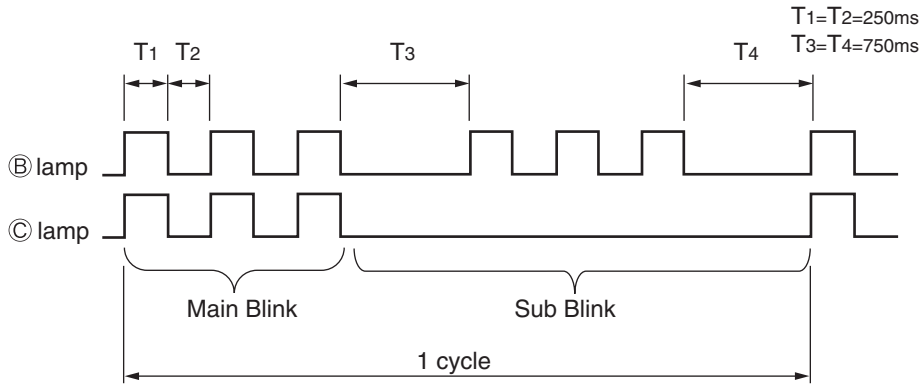
Table 8-2

Allocation of switch lamps



Main Blink: Ⓑ and Ⓒ lamps blinking simultaneously.
Sub Blink: Only Ⓑ lamp blinking.

The following describes Main Blink and Sub Blink. (EEP ROM error)



Fault	Specific Content	Section to Refer
Power source abnormality	There is no response when turning on the power switch. (No lamps illuminate.)	①
Reset circuit abnormality	The carriage does not move at power ON and lamp some illuminates faintly.	②
Operator panel abnormality	Some lamps do not illuminate (although the carriage moves.)	③
	Some lamps illuminate and stay ON.	④
	Some switches do not function or functions continuously.	⑤
Carriage operation abnormality	The carriage does not move at power ON or an alarm generates while printing thus the print job is stopped and an alarm is indicated.	⑥
	The movement of the carriage is abnormal (runs out of control, vibrates, stops during homing, etc.) and an alarm is indicated.	⑦
Paper feed abnormality	Paper-end is generated even when paper is set. (Lamp Ⓒ goes on.) Paper-end does not generate even in paper-end condition. (Lamp Ⓒ goes off.)	⑧
	Line is not fed upon receiving/printing data.	⑨
Ink ribbon feed abnormality	Print result is faint. The ink ribbon is not fed properly or is not sent at all.	⑩
Print condition abnormality	Print dots are missing.	⑪
	Space movement is normal but print is not performed.	⑫
Interface abnormality	Upon receiving/printing data: Spacing or printing is not performed and Lamp Ⓑ is lluminating goes on.	⑬
	Upon receiving/printing data: Wrong characters are printed. Some characters are missing. Lamp Ⓑ is illuminating.	⑭

① There is no response when turning on the power switch. (No lamps illuminate.)

- Is the AC cord conduction normal?
  - N: Replace the AC cord.
  - Y: Is the AC fuse (F1) in the Pow Unit burned out?
    - Y: Replace the Pow Unit.
    - N: Is the LF Motor Cable disconnected from the LF MOT Connector on the LFT print circuit board, or is the SP Motor Cable disconnected from the SP MOT Connector on the LFT print circuit board?
      - Y: Connect the Motor Cable to the LFT print circuit board properly.
      - N: Is the LF Motor Cable broken?
        - Y: Replace the LF Motor.
        - N: Is the SP Motor Cable broken?
          - Y: Replace the SP Motor.
          - N: Is the voltage in the table bellow being out put to the connector (POW) for the Pow Unit?

Connector	Pin No.	Voltage
CN1	1, 2, 12~15	+35V
	4, 5, 11	0V (logic-type)
	6, 10	+5V
	7~9	0V (drive-type)

- Y: Replace the LFT print circuit board.
- N: Replace the Pow Unit.

② The carriage does not move at power ON and lamp some illuminates faintly.

- Replace the LFT print circuit board.

③ Some lamps do not illuminate (although the carriage moves.)

- Replace the LFT print circuit board.

④ Some lamps illuminate and stay ON.

- Replace the LFT print circuit board.

⑤ Some switches do not function or functions continuously.

- Replace the LFT print circuit board.

⑥ The carriage does not move at power ON or an alarm generates while printing thus the print job is stopped and an alarm is indicated.

- Does the carriage move smoothly by hand when the power is turn OFF?
  - N: Does the carriage move smoothly with the ribbon cartridge removed?
    - N: Readjust the carriage unit.
    - Y: Replace the ribbon cartridge.
  - Y: Is +35V being output properly? (See Section ①)
    - N: Replace the Pow Unit.
    - Y: Is the fuse (F502) burned out?
      - Y: Replace the LFT print circuit board.
      - N: Is the SP motor cord connected properly?
        - N: Connect the cord properly.
        - Y: Turn OFF the power, remove the SP motor connection, and confirm that the resistance between pins 1-2 and 3-4 of the SP motor connector (SPMOT) is approximately 2.4Ω±10%.
          - N: Replace the space motor.
          - Y: Replace the LFT print circuit board.

⑦ The movement of the carriage is abnormal (runs out of control, vibrates, stops during homing, etc.) and an alarm is indicated.

- Is the SENSOR cord connected, and the attachment of a home position sensor properly?
  - N: Connect the cord or attachment the home position sensor properly.
  - Y: Is the output of HP-N (SENSOR1 connector - 9 pin) signals proper?
    - N: Replace the home position sensor.
    - Y: Does the carriage move smoothly when the power is turned OFF?
      - N: Does the carriage move smoothly with the ribbon cartridge removed?
        - N: Readjust the carriage unit.
        - Y: Replace the ribbon cartridge.
      - Y: Turn OFF the power and confirm that the resistance between pins 1-2 and 3-4 of SPMOT connection on the L24 print circuit board is approximately 2.4Ω±10%.
        - N: Replace the space motor.
        - Y: Replace the LFT print circuit board.

⑧ Paper-end is generated even when paper is set. (Lamp Ⓒ goes on.) Paper-end does not generate even in paper-end condition. (Lamp Ⓒ goes off.)

1) When using cut-sheets:

Set to menu mode and perform menu print.

If PE detect is set to OFF, reset to ON, and after confirming that paper-end is indicated, set to menu mode OFF.

Perform the following procedure if paper-end is not indicated.

- Does the sensor lever more smoothly by hand?
  - N: Readjust the sensor lever.
  - Y: Replace the LFT print circuit board.

⑨ Line is not fed upon receiving/printing data.

- Is the LF motor cord connected properly?
  - N: Connect the cord properly.
  - Y: Turn OFF the power, remove the LF motor connector, and confirm that the resistance between pins 1-2 and 3-4 of the LF motor connector (LFMOT) is approximately 7.3Ω±10%.
    - N: Replace the LF motor.
    - Y: Replace the LFT print circuit board.

⑩ Print result is faint.
The ink ribbon is not fed properly or is not sent at all.

- Is the ribbon being fed properly during a print job?
  - N: Remove the ribbon cartridge and check if the ribbon feed mechanism is operating properly.
    - N: Replace the ribbon feed gear assembly.
    - Y: Replace the ribbon cartridge.
  - Y: Has the ink ribbon reached its life?
    - Y: Replace the ribbon cartridge.
    - N: Is the head gap set at the regulated value?
      - N: Readjust the head gap.
      - Y: Replace the print head.

⑪ Print dots are missing.

- Is the head gap set at the regulated value?
  - N: Readjust the head gap properly.
  - Y: Are dots still missing after replacing the print head?
    - N: End the procedure.
    - Y: Are dots still missing after replacing the space motor assembly?
      - N: End the procedure.
      - Y: Are the sections between the LFT print circuit board HD1, HD2 ↔ head cable ↔ carriage ↔ print head connected properly?
        - N: Reinstall properly.
        - Y: Replace the LFT print circuit board.

⑫ Space movement is normal but print is not performed.

- Is print disabled even after replacing the print head?
  - N: End the procedure.
  - Y: Are the sections between the LFT print circuit board HD1, HD2 ↔ head cable ↔ carriage ↔ print head connected properly?
    - N: Reinstall properly.
    - Y: Replace the L24 print circuit board.

⑬ Upon receiving/printing data:
Spacing or printing is not performed and Lamp Ⓑ is lluminating goes on.

- Is the interface cable connected properly?
  - N: Connect the cable propenly.
  - Y: Replace the LFT print circuit board.

⑭ Upon receiving/printing data:
Wrong characters are printed. Some characters are missing. Lamp Ⓑ is illuminating.

- Is the interface cable connected properly?
  - N: Connect the cable propenly.
  - Y: Replace the LFT print circuit board.

9. PERIODICALLY REPLACED PARTS

The following parts shall be replaced in the designated period.

Table 9-1 Periodically Replaced Parts

No.	Name	Part No.	Replacement cycle [time (H) is POWER ON TIME]
1	Print head	43441602	400million dots/pin
2	Ribbon protector	43719201	Estimated 2000H (actual operation)

10 OPERATION

10.1 Summary

The main configuration of this printer is the print mechanism unit and print control unit.
The print mechanism unit can be divided broadly into the print head, space system, paper-feed system, and ribbon-feed system. The operation of each item is listed below.

(1) Print head .....Prints with the 24 wire-dot magnet. The dot patterns are configured in the print control unit.

(2) Space system .....The stepping motor moves the carriage and performs spacing, tab, and carriage return.

(3) Paper-feed system.....Paper is fed by the stepping motor.

(4) Ribbon-feed system .....Ribbon is fed by obtaining drive force from the stepping motor just as in the space system.

(5) Print control unit.....Controls the interface and mechanism with one SH7034B microprocessor (µCPU).

10.2 Circuit Operation (See Fig. 10-1)

The circuit of this printer consists of the control board and carriage board.
Circuits such as µCPU and its peripheral circuits, drive circuits, and the external interface circuit are set on the control board.
The switches and LED are set on the control board.
With the control board being the main board, the boards are connected by cables.

10.2.1 µCPU and peripheral circuits

(1) µCPU (CPU: SH7034B)
The µCPU is a 16-bit one-chip CPU which operates the peripheral circuits. Each I/O port is set as ADDRESS - BUS, DATA - BUS, and various control lines. It is capable of 8-channel A/D converter input and has five timers.

(2) Program ROM (F-ROM: 29LV320)
The control program of the printer is stored. µCPU operates according to the contents and various controls are performed.

(3) DRAM (DRAM)
This is used to store various data for data received in 4Mbit RAM or print buffer, etc.

(4) LSI (LSI: MALU)
This is an LSI exclusively for the print head controller, external interface, and motor control. It has the following functions.

(a) Print head data control
Print data is unarchived to the print timing of a disperse allocation head and controls 24-pin worth of impact data drive time.

(b) Dot timing generating function
Dot timing (IPT) in sync with the print speed is generated and notifies the information to µCPU.

(c) Speed control function of the space motor
The speed of the space motor is controlled and input command from µCPU. Furthermore, the space motor speed in various print modes are also controlled.

(d) Parallel interface function
IFD 1-8 are used as input/output data of parallel data. Parallel data sent from the interface connector is latched by strobe signal STB-N and is read into µCPU by a RD signal. Furthermore, control signals such as BSY-N, ACK, PE-N, and SEL-N are output to the interface connector by WR signals.

(e) I/O port
The I/O port has input/output ports and controls various signals by input command from µCPU.

(f) USB interface function

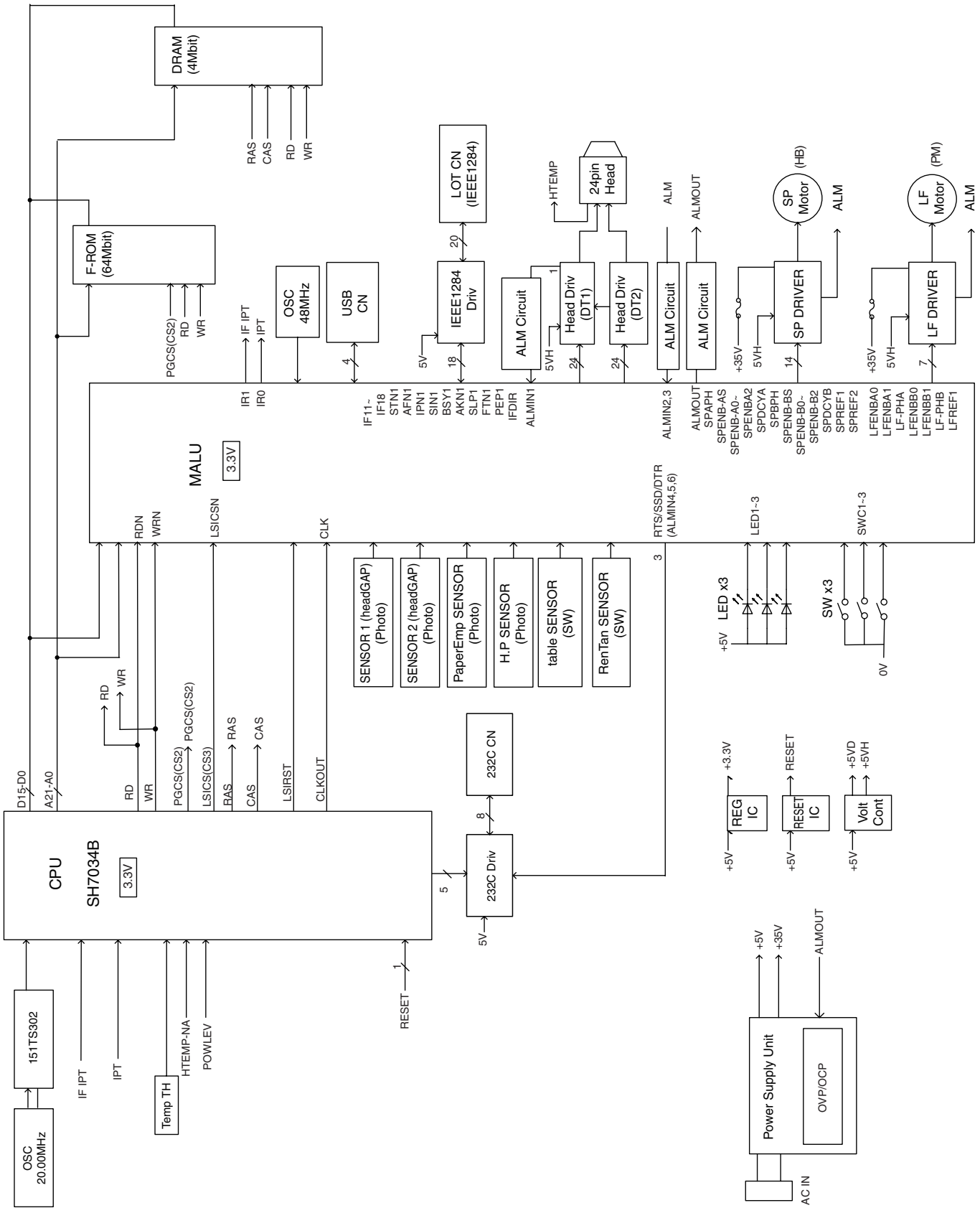

DRAM (4Mbit)
RAS
CAS
RD
WR
F-ROM (64Mbit)
PGCS(CS2)
RD
WR
IF IPT
IPT
OSC 48MHz
USB CN
4
LOT CN (IEEE1284)
20
IEEE1284 Driv
5V
18
HTEMP
24pin Head
ALM
ALMOUT
SP Motor (HB)
ALM
LF Motor (PM)
ALM
ALM Circuit
5VH
1
Head Driv (DT1)
Head Driv (DT2)
24
24
ALM Circuit
ALM Circuit
+35V
5VH
SP DRIVER
14
+35V
5VH
LF DRIVER
7
IR1
IR0
IF11~ IF18 STN1 AFN1 IPN1 SIN1 BSY1 AKN1 SLP1 FTN1 PEP1 IFDIR ALMIN1
ALMIN2,3
ALMOUT SPAPH SPENB-AS SPENB-A0~ SPENB-A2 SPDCYA SPBPH SPENB-BS SPENB-B0~ SPENB-B2 SPDCYB SPREF1 SPREF2
LFENBA0 LFENBA1 LF-PHA LFENBB0 LFENBB1 LF-PHB LFREF1
MALU
3.3V
RDN
WRN
LSICSN
CLK
RTS/SSD/DTR (ALMIN4,5,6)
3
LED1~3
SWC1~3
SENSOR 1 (headGAP) (Photo)
SENSOR 2 (headGAP) (Photo)
PaperEmp SENSOR (Photo)
H.P SENSOR (Photo)
table SENSOR (SW)
RenTan SENSOR (SW)
+5V
LED x3
SW x3
0V
RD
WR
PGCS(CS2)
LSICS(CS3)
RAS
CAS
LSIRST
CLKOUT
D15-D0
A21-A0
RD
WR
PGCS(CS2)
LSICS(CS3)
RAS
CAS
LSIRST
CLKOUT
232C CN
8
232C Driv
5
5V
CPU
SH7034B
3.3V
+3.3V
REG IC
+5V
RESET
RESET IC
+5V
+5VD
+5VH
Volt Cont
+5V
RESET
1
151TS302
OSC 20.00MHz
IF IPT
IPT
Temp TH
HTEMP-NA
POWLEV
+5V
+35V
ALMOUT
Power Supply Unit
OVP/OCP
AC IN

Fig. 10-1

10.2.2 Initializing operation

The initializing operation is performed for this printer when the power is turned ON and when I-PRIME for the parallel interface is input from the Host.
In the initializing operation, the RST-N signal is first output from the reset IC (RST-1 pin) to reset CPU (µCPU). The program start after CPU is reset.
The program sets the LSI mode including µCPU (CPU), checks the memory (ROM/RAM), and initializes the RAM. Then it determines the phase of the LF motor and performs homing for the carriage. Finally, it determines the interface signal (outputs ACK signal and BUSY signal), illuminates the [連線] lamp, notifies the Host that it is in a mode that can receive data (data standby mode), and completes initialization. (Paper-end mode when using continuous form is excluded.)

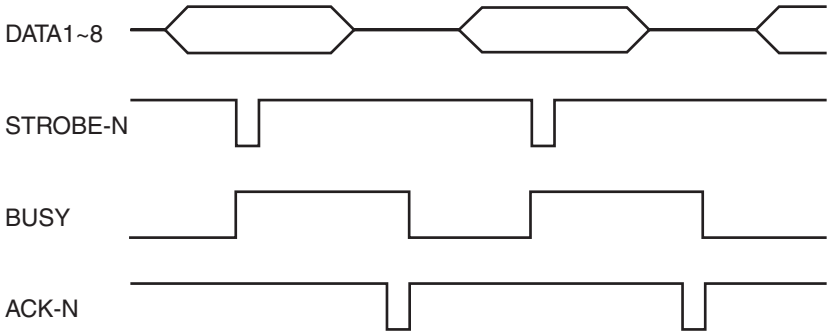
10.2.3 Controlling the interface

1) Parallel interface

Data from the interface is input from the connector (CENT) and is read in the timing of the STROBE-N signal by the interface, print head, and LSI for motor control (LSI: MALU).

When this signal is being process, the BUSY signal goes ON. When the process is completed, the BUSY signal goes OFF, sends an ACK-N signal, and waits to receive the next data.

(E.g.) When [I/F timing] is set to [A-B] in an English menu.

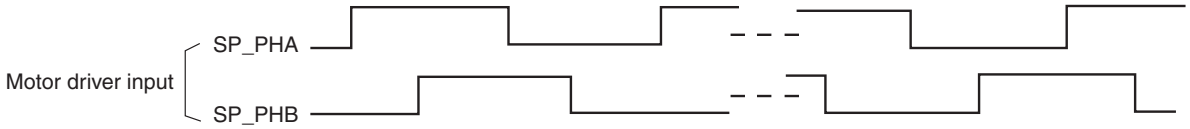


10.2.4 Print head control drive circuit

This circuit produces the print timing and drive time from LSI, drives the head magnet that corresponds to HEAD 1~24 with HD01-24-P signal and HDCOM1~4 - P signal and prints.
As the print head is dispersed and allocated in each group, the four groups are controlled individually.

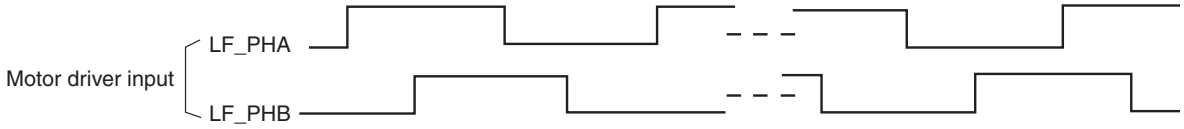
10.2.5 Spacing

The LSI (LSI: MALU) outputs space motor phase signals (SPV, SPW) when it receives a spacing command from µCPU. It outputs IPT signals as the dot timing and carriage position detection timing in sync with these phase signals.
The space motor phase signals (SPV, SPW) are input to the motor driver, which drives the space motor.



10.2.6 Line feed

The LF motor phase signals (LF_PHA, LF_PHB) from LSI (LSI:30R0120-036) are input to the motor driver, which drives the LF motor.



10.2.7 Alarm circuit

(1) High-temperature head alarm

The temperature of the head is monitored by a thermistor embedded in the head to protect the head coil.

The head temperature will rise after continuous heavy-duty print jobs. Therefore, when the head rises beyond a specified temperature, a thermal alarm mode will be entered, and after the current line is printed, the speed for printing the following lines will be decreased. Furthermore, if the head temperature does not fall, the following lines will be divided into two depending on the temperature, and printed by single-direction print.

The alarm is detected when the resistance of the thermistor decreases from the rise in the head temperature and µCPU is input in the A/D converter.

10.2.8 Paper-end detect circuit

When paper runs out, the photosensor (PE) goes Hight level and the paper-end signal becomes [1]. This signal is input in µCPU (CPU: SH1) which goes on the Lamp Ⓒ.

10.2.9 Power source unit

The power source unit supplies DC+35V, and +5V to each section by switching power.

10.3 Mechanism and Operation

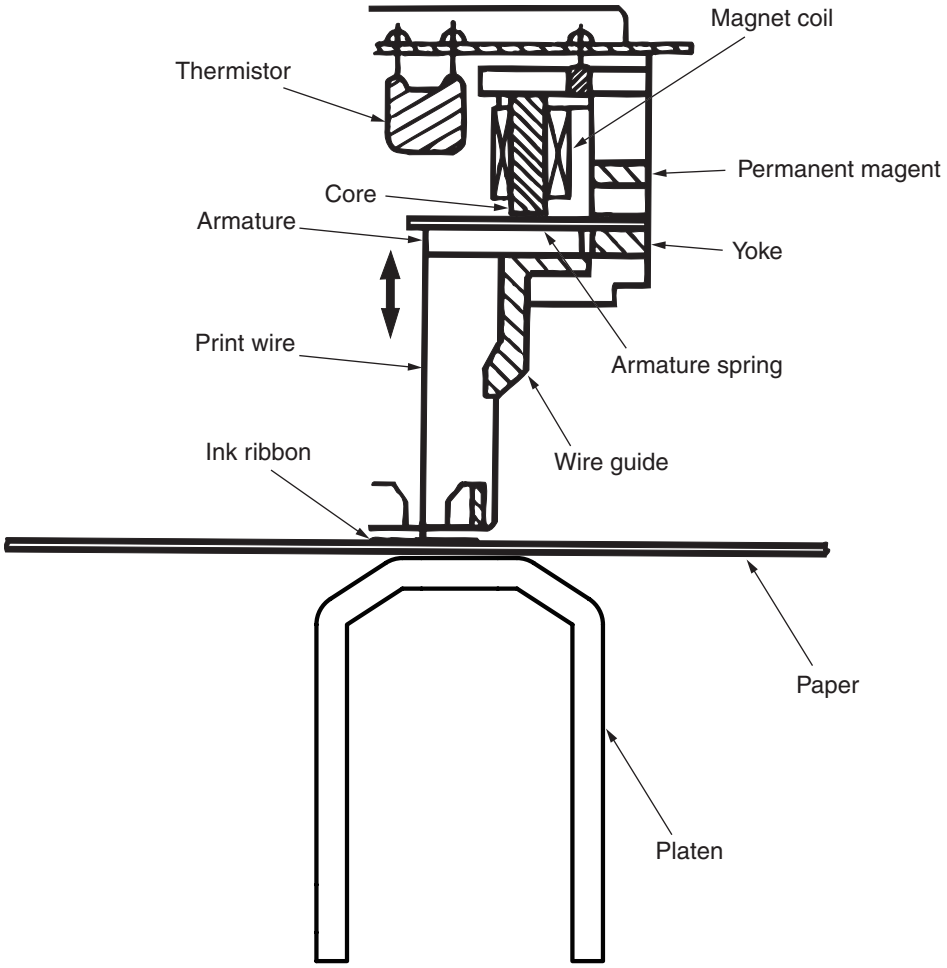
10.3.1 Mechanism and operation of the print heat

The print head is a spring charge type head using a permanent magnet and is installed on a carriage that moves in parallel with the platen.

(1) Operation of the print head

An armature is normally absorbed to the core by warping an armature spring with a permanent magnet. The status of the print wire, which is integrated with the armature, will also be reset at this time.

When the magnet coil is energized by the print command from the device control unit, a magnetic flux opposite to that of the permanent magnet is generated. Then, the armature moves in the opposite direction of the core from the force of the armature spring and the print wire collides with the platen. Paper and ink ribbon are set between the the platen and print wire, and due to this collision, the ink on the ink ribbon is transferred on to the paper.

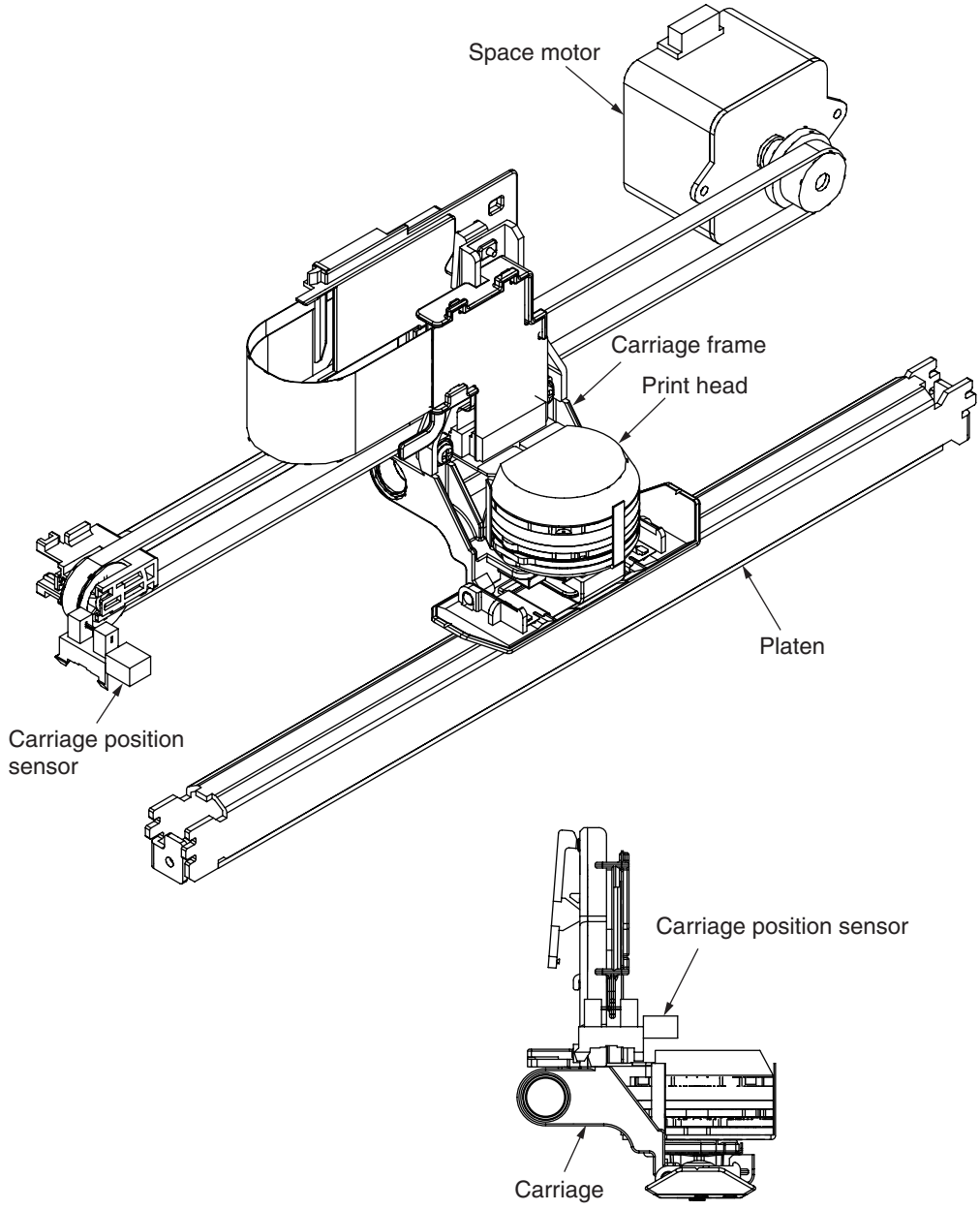


10.3.2 Mechanism and operation of space

The space mechanism of printers consists of several parts, including a carriage shaft placed parallel to a platen and a carriage frame that moves along the carriage shaft. The space mechanism is driven by a space motor located behind the carriage frame.

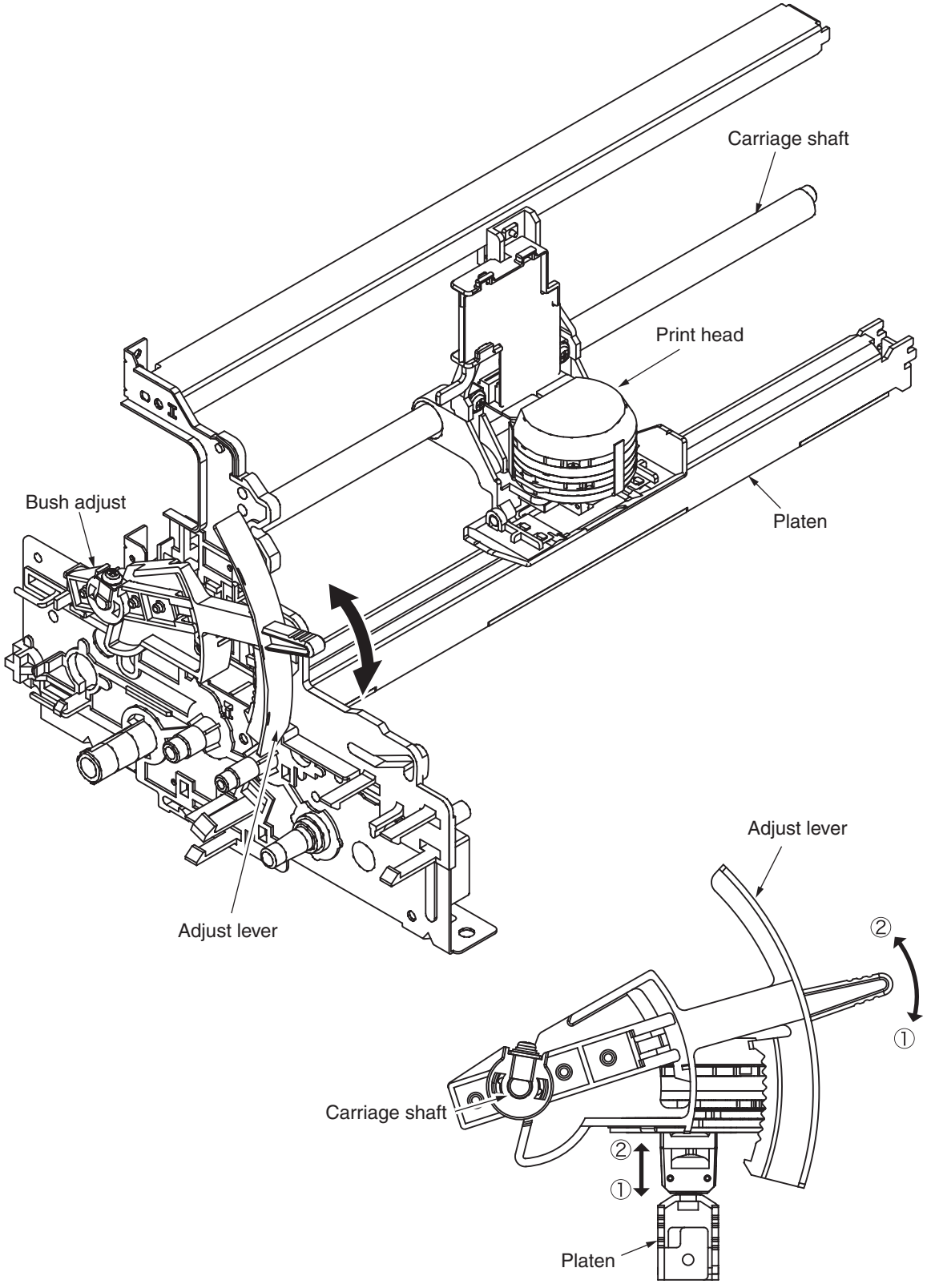
(1) Spacing operation

A carriage carrying a print head moves on its shaft parallel to a platen. As a space motor revolves, the power of the space motor is transferred to a mini pitch belt. This completely moves the carriage. The position of the frame of the carriage is identified by the numbers of pulses from right and left carriage position sensors.



10.3.3 Mechanism for adjusting the head gap

The head gap adjustment is a mechanism to correct the gap between the print head and platen by moving the adjust lever vertically and rotating and moving the carriage shaft up and down.
The movement of the adjust lever rotates the carriage shaft that is connected directly to the adjust lever.
The carriage shaft is decentered against the fulcrum of the adjust lever (section fit with the carriage shaft), therefore, the carriage shaft moves up and down when the adjust lever rotates. The print head then moves to-and-fro the platen.



10.3.4 Mechanism and operation of ribbon feed

Ribbon feed is a mechanism to feed the ribbon which is driven by the stepping motor.

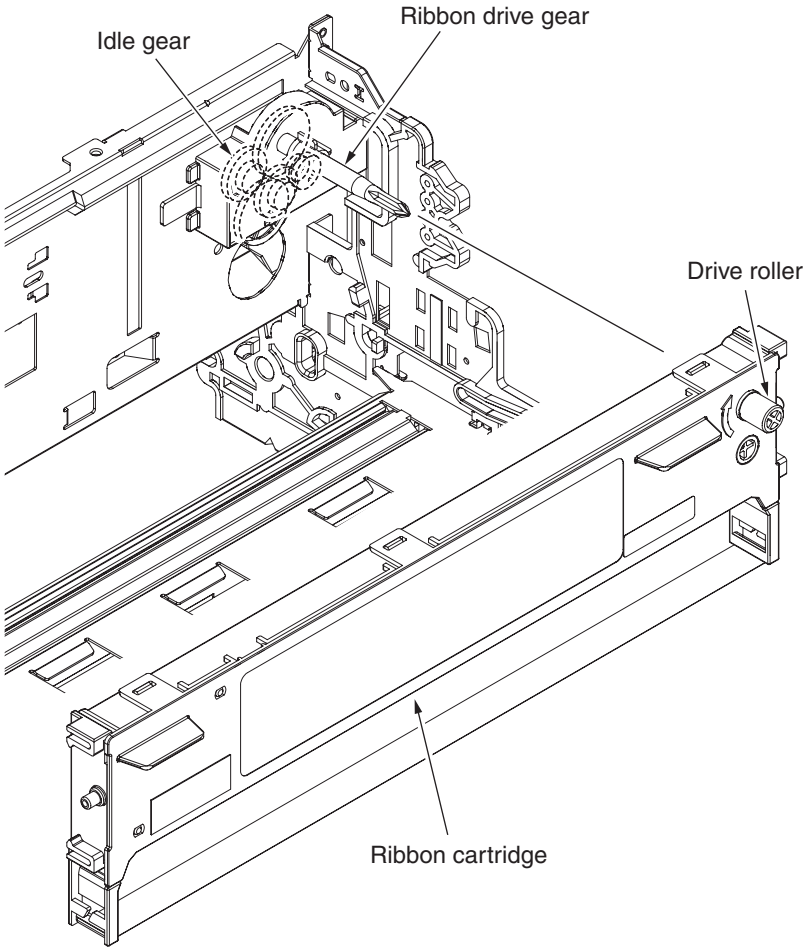
(1) Ribbon cartridge

The use of a one-way feed endless ribbon provides clear print results.

(2) Feed operation

Ribbon feed is initiated at the same time the spacing operation is initiated regardless of the mode, and stops when the spacing operation is ceased.

The rotation of a driven stepping motor is transferred to the drive roller in the ribbon cartridge via the ribbon gear which feeds the ink ribbon.



10.3.5 Mechanism and operation of paper feed

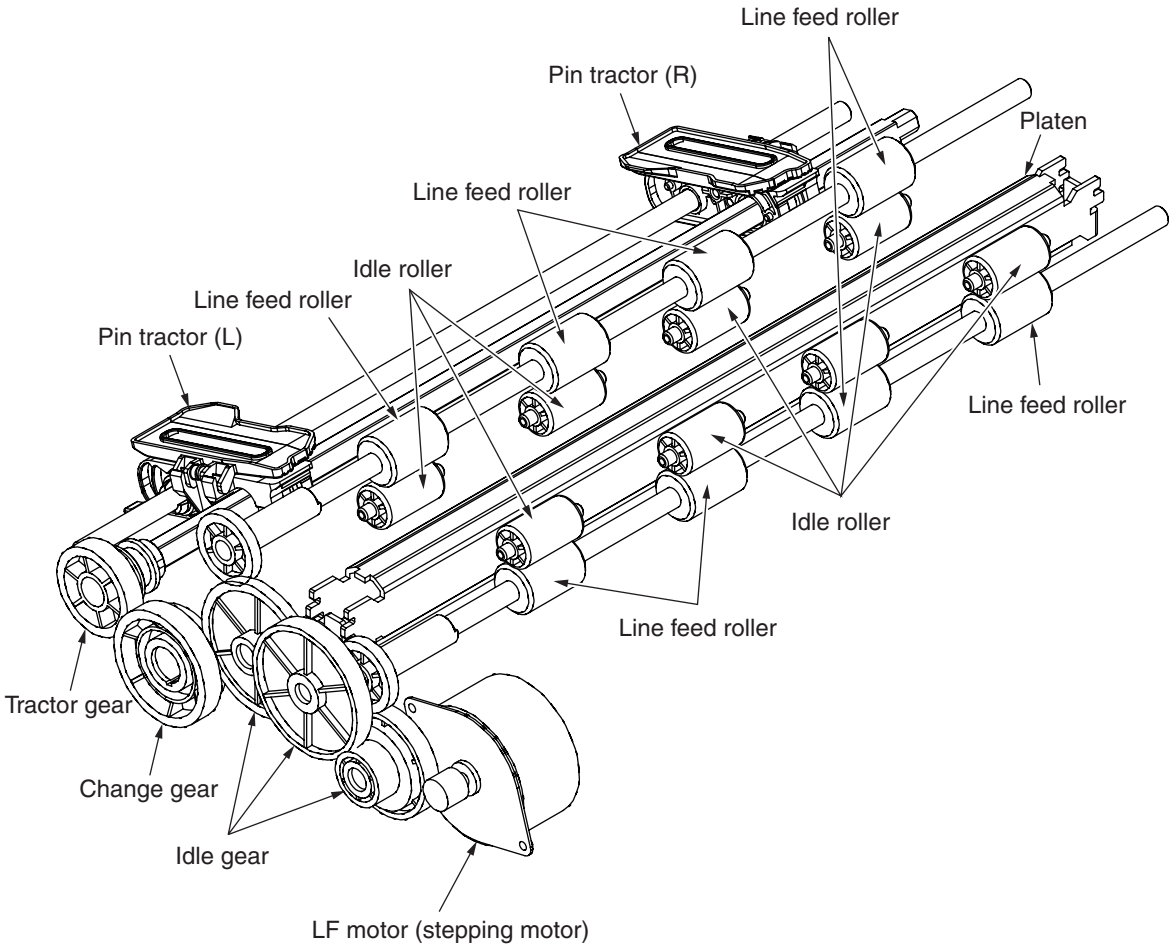
The line feed operation is driven by the LF motor that feeds the line feed roller and pin tractor.

(1) Paper feed operation

The LF motor (stepping motor) for feeding paper is installed on the left frame and the rotation of the motor is transferred to the platen gear via the deceleration gear.

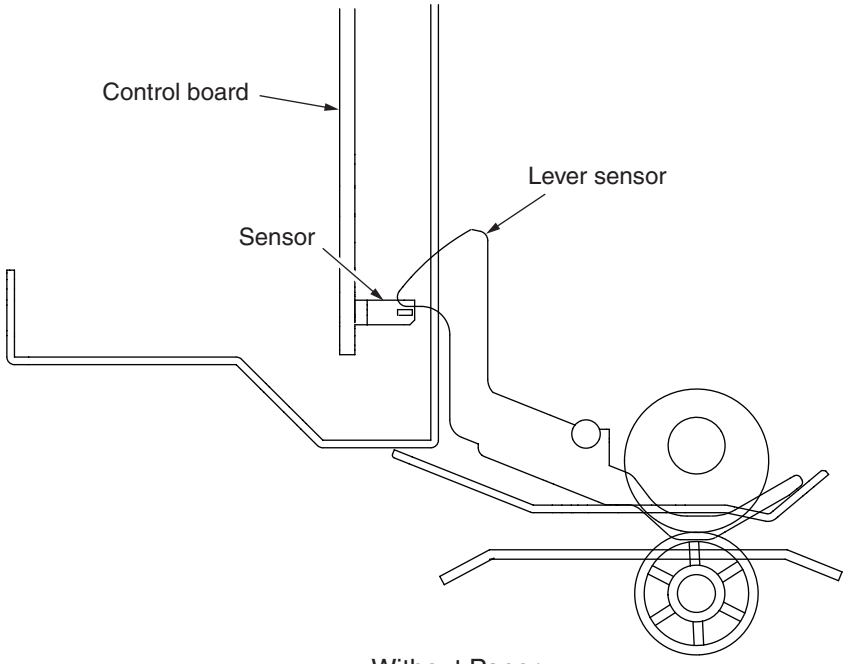
The rotation of the line feed roller is also transferred to the pin tractor by switching the change gear.

It is mechanically designed so that paper is fed by 0.139 inch (3.5mm) when the LF motor rotates 48 steps (360 degrees).

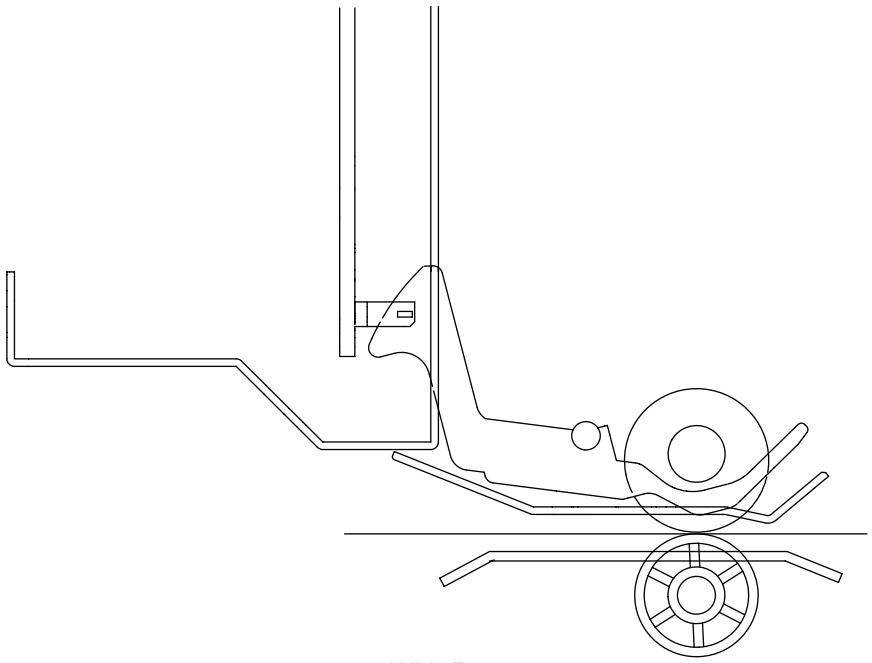


10.3.6 Mechanism for detecting the paper-end

When paper is inserted, the paper blocks the leading end of lever sensor from entering the groove on the upper sheet guide, thus, the status of the paper-end sensor is ON. However, when paper is present, lever sensor enters the groove of the upper sheet guide and the sensor is cut off by rear portion of lever sensor. With this operation, the status of the paper-end sensor becomes OFF and paper-end is detected. Paper-end is detected at approximately 22mm of the remaining paper length from the print position. When using cut-sheet, however, paper-end may not be detected upon operational control even when the paper-end sensor is OFF. (The following figures describes the front paper-end sensor.)



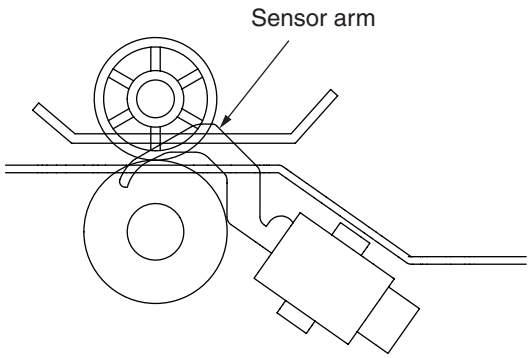
Without Paper



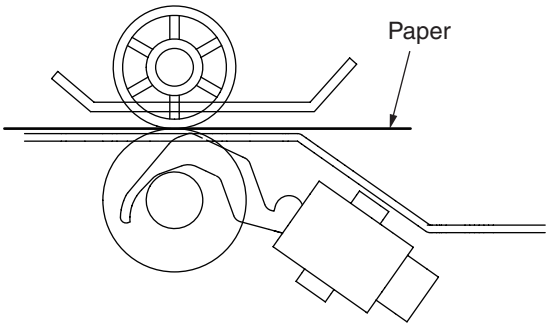
With Paper

10.3.7 Mechanism for detecting the table sensor

When paper is inserted in the stage, the paper blocks the leading end of table sensor from entering the groove on the upper sheet guide, thus, the status of the stage sensor is ON. However, when paper is present, table sensor enters the groove of the upper sheet guide and the sensor is cut off by rear portion of table sensor. With this operation, the status of the stage sensor becomes OFF.



With Paper



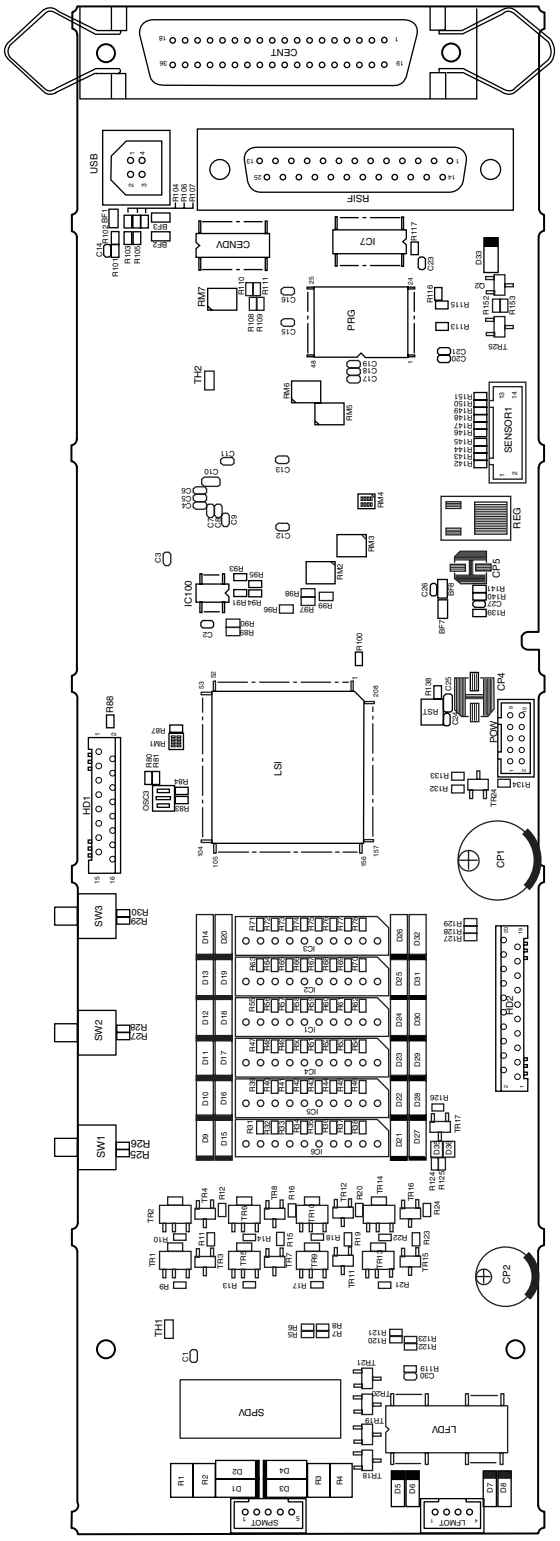
Without Paper

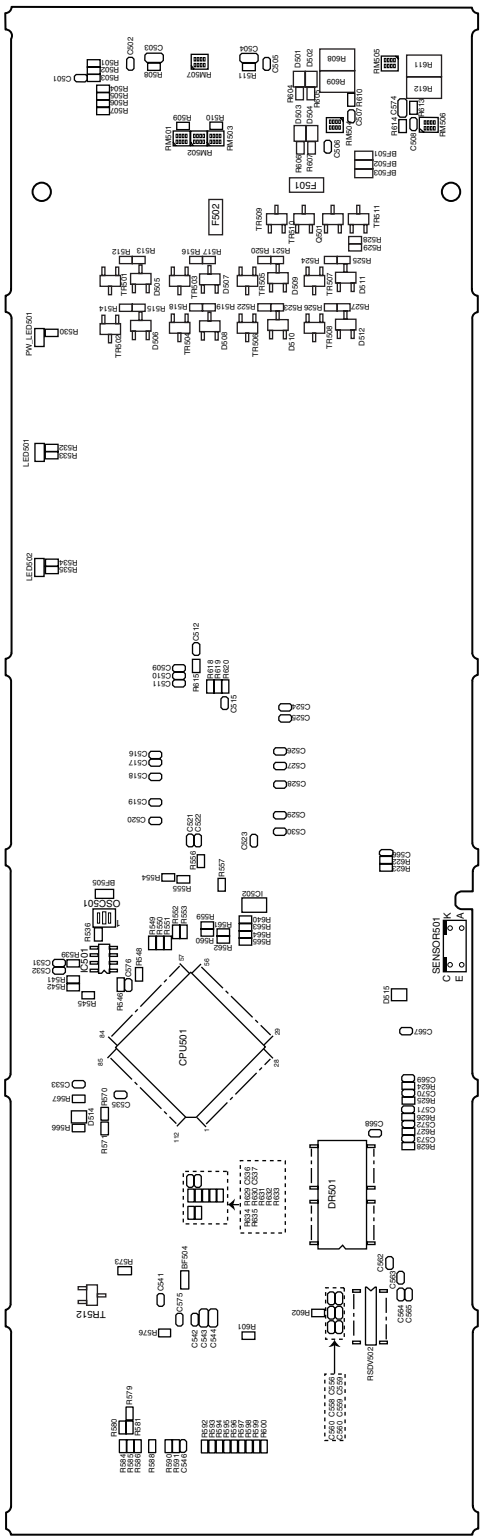
APPENDIX A PCB LAYOUT

-PCB List-

(1) Circuit board, LFT (Main Controller)

ML5100FB


CENT
USB
RSIF
CENDV
IC7
PRG
SENSOR1
REG
IC100
LSI
HD1
SW3
SW2
SW1
CP1
CP2
CP4
CP5
SPDV
LFDV
SPMOT
LFMOT


F501
F502
PW LED501
LED501
LED502
CPU501
DR501
SENSOR501
TH512
RSNV902